SLR

August 20, 2015

Ms. Alicia Boltz
Air Quality Engineer
Wyoming Dept. of Environmental Quality – Air Quality Division
122 W. 25th Street
Cheyenne, WY 82002

Re: Response to Incompleteness Letter
Application A0000944 Stud Horse Butte 1-29 Central Facility
Jonah Energy LLC

Dear Ms. Boltz,

Under cover dated April 29, 2015, Jonah Energy LLC (Jonah) submitted a Chapter 6, Section 2 air quality permit application to the Wyoming Department of Environmental Quality - Air Quality Division (WDEQ) for the request to install and operate one (1) natural gas-fired compressor engine with a maximum horsepower (hp) of 1,850 hp and two (2) 1.0 MMBtu/hr separator heaters. The WDEQ confirmed receipt of the permit application on May 6, 2015, and assigned Application Number A0000944 to the Stud Horse Butte 1-29 (SHB 1-29) compressor engine application.

On May 18, 2015, the WDEQ issued an Incomplete Application determination on the SHB 1-29 compressor engine application, requesting additional release point information be provided on the IMPACT application forms, along with the request to submit AERMOD modeling for the project.

Since the receipt of the May 18, 2015 letter from the WDEQ, Jonah has finalized the line pressure reduction project compression requirements at the SHB 1-29 production facility, resulting in the requirement to install two (2) compressor engines instead of one (1) compressor engine.

Therefore, on behalf of Jonah, SLR International Corporation (SLR) is pleased to provide the attached AERMOD dispersion modeling, updated emissions calculations, and IMPACT application forms in response to the incompleteness determination dated May 18, 2015 for Jonah's Stud Horse Butte 1-29 (SHB 1-29) Central Facility.

SLR International Corporation 1612 Specht Point Road, Suite 119, Fort Collins, CO 80525
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SLR conducted the AERMOD dispersion modeling in accordance with our discussions with Mr. Nathan Henschel and Mr. Josh Nall and following applicable WDEQ minor source modeling guidance. A description of the modeling inputs, methodology and results is provided in **Attachment A**. Detailed emissions calculations for the compressor engines and heaters along with vendor sheets are provided as **Attachment B**. The applicable IMPACT application forms are provided as **Attachment C** and **Attachment D** contains the electronic modeling input/output files along with a pdf version of this letter response and associated attachments.

We are assuming that you will make sure the modeling I/O files and supporting information are provided to Mr. Nathan Henschel for his review. If you have any questions regarding the emissions calculations and/or IMPACT forms please do not hesitate to contact Chuck Cornell of Jonah at (720) 577-1251 or me at (970) 999-3969. Any questions regarding the modeling please have Mr. Henschel contact Jason Reed of SLR at (970) 999-3970.

We trust this information will be sufficient for the Division to deem the permit application complete, and we thank you in advance for your prompt review of this most important application.

Sincerely,
SLR International Corporation

Jamie Christopher

Jamie Christopher
Principal Engineer
jchristopher@slrconsulting.com

JC/
Enc.

ATTACHMENT A - Modeling Methodology and Results

MODELING METHODOLOGY AND INPUTS

SLR conducted air dispersion modeling for the proposed modification of the SHB 1-29 Central Facility using the latest version of the AERMOD modeling system including:

- AERMAP version 11103;
- AERSURFACE version 13016;
- AERMET version 15181; and
- AERMOD version 15181.

The meteorological data used in the analysis was the 2010-2014 Juel Spring surface meteorological data and Riverton upper air data[1]. The Juel Spring data include horizontal wind speed and direction, ambient temperature, 10-2 meter temperature difference, and total solar radiation. Horizontal wind direction standard deviation (sigma-theta) is also calculated at the Juel Spring site; however, based on direction received from the WDEQ[2], the sigma-theta data were not used.

The 2011 National Land Cover Dataset (NLCD) was used to obtain geophysical parameters, in twelve 30° sectors, for the area centered around the Juel Spring tower location. The selection of seasons for each month was based on WDEQ guidance[3,4], which assumes default seasons except for winter in which an analysis of snow cover was conducted. If a month had greater than 50% of the days with a snow depth of more than 1", it was classified as winter with snow; otherwise it was classified as winter with no snow. The snow cover and precipitation data from the nearby Boulder Rearing Station was used to perform this classification as well as the moisture levels of dry, average or wet based on EPA guidance[5].

Receptors were generated following the WDEQ guidance and elevations were obtained using AERMAP and elevation data from the National Elevation Dataset (NED). All preprocessing files for AERSURFACE, AERMET and AERMAP are provided in the attached CD (**Attachment D**).

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[1] The Juel Spring surface data was provided by WDEQ to SLR by email on May 20, 2015. The upper air data was obtained from the NOAA FSL database: http://esrl.noaa.gov/raobs/.

[2] E-mail from Josh Nall on July 20, 2015 recommending that Juel Spring sigma-theta data not be used in the AERMET processing.

[3] WDEQ-AQD Minor Source Modeling Guidance, September 2014.

[4] This was provided by WDEQ to SLR by email on May 20, 2015.

[5] AERSURFACE User's Guide Revised 01/16/2013. Each month's precipitation (2010-2014) was compared to the period of record average monthly precipitation to determine if that month was dry, average or wet.

AERMOD MODELING AND RESULTS

Dispersion modeling for SHB 1-29 was performed for annual NO_2 and formaldehyde impacts following discussions with WDEQ. The model was run in default mode to determine the maximum annual impacts for each year in the five-year modeling period. The ambient ratio method (75% conversion of modeled NO_X-to-NO_2) was applied to the maximum annual NO_x concentrations for comparison to the Wyoming Ambient Air Quality Standards (WAAQS) and Class II increment. The emissions and stack parameters for the two (2) compressor engines and two (2) heaters are provided in **Attachment B**. The compressor engine stack heights are sufficient to meet the WDEQ minor source modeling requirement that the engine stack heights must be at least 1.5 x higher than the compressor building height. In this case, the engine stack heights are 1.5 x 17.5'; or 26.25' above ground level.

Due to the close proximity (approximately 3.5 km) from another proposed Jonah Energy project (SHB 13-26), both SHB 1-29 and 13-26 were included in the modeling to address potential source overlap. In addition, WDEQ provided an off-site inventory for NO_2 and formaldehyde to assess cumulative impacts[6]. The offsite inventories were used as-provided with the exception of the modification of some sources with zero base elevations, one source with incorrect coordinates and the removal of an emergency generator per WDEQ's request[7].

The modeling results for NO_x and formaldehyde are summarized below in **Tables 1 and 2**, respectively. The modeling demonstrates that the maximum SHB 1-29 impacts are above the Class II NO_2 significant impact level, but are only 7% of the annual NO_2 WAAQS and 19% of the Class II NO_2 increment. The results also demonstrate that there is little overlap between impacts from SHB 1-29 and any other nearby sources including SHB 13-26. The SHB 1-29 maximum formaldehyde cancer risk at any receptor is calculated to be 2.5 per million using the conservative WDEQ methodology[8]. The cumulative formaldehyde cancer risk is calculated to be 9.1 per million. The AERMOD input and output files for both NOx and formaldehyde are provided in the CD included as **Attachment D**.

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[6] The offsite inventories were provided by WDEQ to SLR by email on May 20, 2015.

[7] Email communication between Nathan Henschel (WDEQ) and Jason Reed (SLR).

[8] WDEQ-AQD Minor Source Modeling Guidance, September 2014.

Table 1: SHB 1-29 Annual NOx Modeling Results

Pollutant	Averaging Period [1]	Sources	Maximum Impact Location				Maximum Predicted Impact [2] ($\mu g/m^3$)	Background NO_2 [3] ($\mu g/m^3$)	Class II SIL ($\mu g/m^3$)	WAAQS ($\mu g/m^3$)	Class II Increment ($\mu g/m^3$)	Percent of Standard
			UTM X (m)	UTM Y (m)	Elevation (m)	Year						
NO_2	Annual	SHB 1-29	604026	4701479	2172	2014	6.48	-	1	-	-	> SIL
							4.86	-	-	-	25	19%
								2	-	100	-	7%
NO_2	Annual	SHB 1-29 and SHB 13-26	607500	4700350	2207	2014	12.71	-	-	-	25	51%
								2	-	100	-	15%
NO_2	Annual	SHB 1-29, SHB 13-26 and offsite	607500	4700350	2207	2014	12.94	-	-	-	25	52%
								2	-	100	-	15%

[1] Highest-first-high concentration over all years modeled.

[2] ARM value of 0.75 applied to modeled impact for comparison to the WAAQS and increment; 100% conversion to NO_2 assumed for comparison to the SIL.

[3] Background value of 1 ppb provided by WDEQ on May 20, 2015.

Table 2: SHB 1-29 Annual Formaldehyde Modeling Results

Pollutant	Sources	Averaging Period	Maximum Impact Location				Maximum Predicted Impact ($\mu g/m^3$)	Cancer Risk [2,3] (per million)
			UTM X (m)	UTM Y (m)	Elevation (m)	Year		
Formaldehyde	SHB 1-29	Annual [1]	604075	4701425	2172	2014	0.44	2.5
Formaldehyde	SHB 1-29 and SHB 13-26	Annual [1]	607500	4700350	2207	2014	1.62	9.0
Formaldehyde	SHB 1-29, SHB 13-26 and offsite	Annual [1]	607500	4700350	2207	2014	1.64	9.1

[1] Highest-first-high concentration over all years modeled.

[2] Formaldehyde cancer chronic inhalation factor = 1.30E-05 $(\mu g/m^3)^{-1}$ from http://www2.epa.gov/sites/production/files/2014-05/documents/table1.pdf.

[3] The cancer risk is calculated by: 1.30E-05 x modeled concentration x 10^6 x (30/70) where 30 represents the life of project.

ATTACHMENT B - Emissions Calculations and Supporting Documentation

Jonah Energy , LLC - SHB 1-29 Compressor Station

Modeling Parameters and Emission Rates per Source

ID	Emission Unit	NO_x		Formaldehyde		Stack/Exhaust Parameters																
		short-term	Annual	short-term	Annual	Direction	Capped?	Height Above Grade		Diameter		Flow		Velocity		Temperature			Easting	Northing
1	Cat G3516TA Gas Compressor #1	0.1429 g/s	0.1429 g/s	0.0143 g/s	0.0143 g/s	Vertical	No	26.25 ft	8.00 m	0.83 ft	0.25 m	3,088 acfm	1.46 cubic m/s	94.35 ft/sec	28.76 m/sec	912 F	489 C	762 K	604003.1	4701465.7
2	Cat G3516TALE Gas Compressor #2	*0.1861 g/s*	*0.1861 g/s*	0.0261 g/s	0.0261 g/s	Vertical	No	26.25 ft	8.00 m	1.00 ft	0.30 m	*9,556 acfm*	4.51 cubic m/s	*202.78 ft/sec*	61.81 m/sec	983 F	528 C	*801 K*	604017.6	4701479.0
3	Separator Heater #1	0.0113 g/s	0.0113 g/s	0.00001 g/s	0.00001 g/s	Vertical	No	12.00 ft	3.66 m	0.50 ft	0.15 m	647 acfm	0.31 cubic m/s	54.89 ft/sec	16.73 m/sec	601 F	316 C	589 K	604002.2	4701506.1
4	Separator Heater #2	0.0113 g/s	0.0113 g/s	0.00001 g/s	0.00001 g/s	Vertical	No	12.00 ft	3.66 m	0.50 ft	0.15 m	647 acfm	0.31 cubic m/s	54.89 ft/sec	16.73 m/sec	601 F	316 C	589 K	604008.5	4701498.9

Table A-1 *Jonah Energy , LLC - SHB 1-29 Compressor Station*

Estimated Potential Uncontrolled Emissions per Source

ID	Emission Unit	Annual Criteria Emission Rate - Uncontrolled						
		NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	Total HAP
1	Cat G3516TA Gas Compressor #1	111.29 tpy	130.17 tpy	6.96 tpy	0.49 tpy	0.75 tpy	0.75 tpy	0.95 tpy
2	Cat G3516TALE Gas Compressor #2	6.47 tpy	49.69 tpy	9.06 tpy	0.70 tpy	0.55 tpy	0.55 tpy	4.18 tpy
3	Separator Heater #1	0.39 tpy	0.33 tpy	0.02 tpy	0.00 tpy	0.03 tpy	0.03 tpy	0.007 tpy
4	Separator Heater #2	0.39 tpy	0.33 tpy	0.02 tpy	0.00 tpy	0.03 tpy	0.03 tpy	0.007 tpy
	Totals	**118.54 tpy**	**180.51 tpy**	**16.06 tpy**	**1.19 tpy**	**1.36 tpy**	**1.36 tpy**	**5.15 tpy**

Table A-1a *Jonah Energy , LLC - SHB 1-29 Compressor Station*

Estimated Potential Controlled Emissions per Source

ID	Emission Unit	Annual Criteria Emission Rate - Controlled						
		NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	Total HAP
1	Cat G3516TA Gas Compressor #1	4.97 tpy	14.90 tpy	4.97 tpy	0.49 tpy	0.75 tpy	0.75 tpy	0.82 tpy
2	Cat G3516TALE Gas Compressor #2	6.47 tpy	12.94 tpy	9.06 tpy	0.70 tpy	0.55 tpy	0.55 tpy	1.98 tpy
3	Separator Heater #1	0.39 tpy	0.33 tpy	0.02 tpy	0.00 tpy	0.03 tpy	0.03 tpy	0.007 tpy
4	Separator Heater #2	0.39 tpy	0.33 tpy	0.02 tpy	0.00 tpy	0.03 tpy	0.03 tpy	0.007 tpy
	Totals	**12.22 tpy**	**28.50 tpy**	**14.07 tpy**	**1.19 tpy**	**1.36 tpy**	**1.36 tpy**	**2.82 tpy**

Table A-2 *Jonah Energy , LLC - SHB 1-29 Compressor Station*
Gas Compression IC Engine Criteria Pollutant Emissions Calculations

Engine Data			
IC Engine Make	Caterpillar	Fuel LHV	1,011 Btu/scf
IC Engine Model	G3516TA (4SRB)	Fuel HHV	1,119 Btu/scf
Sulfur Content of Fuel	0.0500 gr/scf	Number of Engines	1
Hours per Year	8,760 hr/yr		

Load	100% Max [1]	75% Load	50%
Power Rating	1,029 bhp	772 bhp	515 bhp
Specific Fuel Consumption LHV	7,700 Btu/bhp-hr	8,080 Btu/bhp-hr	9,196 Btu/bhp-hr
Fuel Consumption (LHV)	7,836.1 scf/hr	6,171.1 scf/hr	4,679.3 scf/hr
Fuel Consumption (LHV)	68.6 MMscf/yr	54.1 MMscf/yr	41.0 MMscf/yr
Duty (input) - HHV	8.77 MMBtu/hr	6.90 MMBtu/hr	5.24 MMBtu/hr
Duty (input) - LHV	7.92 MMBtu/hr	6.24 MMBtu/hr	4.73 MMBtu/hr
Exhaust Stack Temp	912 F	855 F	786 F
Exhaust Gas Flow	3,088 acfm	2,271 acfm	1,511 acfm

Pollutant	Emission Factors @ Loads			Add-On Control & Efficiency	Source
	100% Load	75% Load	50%		
NO_x	11.20 g/bhp-hr	12.10 g/bhp-hr	11.10 g/bhp-hr	NSCR	0.5 b/bhp-hr WDEQ BACT
CO	13.10 g/bhp-hr	10.20 g/bhp-hr	16.20 g/bhp-hr	NSCR	1.5 g/bhp-hr WDEQ BACT
NMHC	0.70 g/bhp-hr	0.70 g/bhp-hr	0.70 g/bhp-hr	NSCR	0.5 b/bhp-hr WDEQ BACT
SO_2	0.01276 lb/MMBtu	0.012756 lb/MMBtu	0.012756 lb/MMBtu	None	AP42 Tbl 3.2-2
PM_{10}	0.019410 lb/MMBtu	0.019410 lb/MMBtu	0.019410 lb/MMBtu	None	AP42 Tbl 3.2-2
$PM_{2.5}$	0.019410 lb/MMBtu	0.019410 lb/MMBtu	0.019410 lb/MMBtu	None	AP42 Tbl 3.2-2
HCHO	0.05 g/bhp-hr	0.05 g/bhp-hr	0.05 g/bhp-hr	NSCR	0.05 g/bhp-hr WDEQ BACT
CO_2	53.02000 kg/MMBtu	53.02000 kg/MMBtu	53.02000 kg/MMBtu	None	Part 98, Subpart C
CH_4	1.61 g/bhp-hr	1.53 g/bhp-hr	2.12 g/bhp-hr	None	Manufacturer
N_2O	0.00010 kg/MMBtu	0.00010 kg/MMBtu	0.00010 kg/MMBtu	None	Part 98, Subpart C

One Cat G3516TA Engine - Controlled Emission Rates - All Loads												
Pollutant	100%		75% Load		50%		100%		75% Load		50%	
	lb/hr	g/s	lb/hr	g/s	lb/hr	g/s	TPY	g/s	TPY	g/s	TPY	g/s
NO_x	1.13	0.1429	0.92	0.1159	0.56	0.0708	4.97	0.1429	4.03	0.1159	2.46	0.0708
CO	3.40	0.4288	1.99	0.2505	2.10	0.2651	14.90	0.4288	8.71	0.2505	9.22	0.2651
NMHC	1.13	0.1429	0.85	0.1073	0.57	0.0715	4.97	0.1429	3.73	0.1073	2.48	0.0715
SO_2	0.112	0.0141	0.0881	0.0111	0.0668	0.0084	0.49	0.0141	0.39	0.0111	0.29	0.0084
PM_{10}	0.17	0.0214	0.13	0.0169	0.10	0.0128	0.75	0.0214	0.59	0.0169	0.45	0.0128
$PM_{2.5}$	0.170	0.0214	0.134	0.0169	0.102	0.0128	0.745	0.0214	0.587	0.0169	0.445	0.0128
HCHO	0.11	0.0143	0.09	0.0107	0.06	0.0071	0.50	0.0143	0.37	0.0107	0.25	0.0071
CO_2	1,024.79	129.12	807.04	101.68	611.95	77.10	4,488.6	129.12	3,534.8	101.68	2,680.3	77.10
CH_4	2.61	0.3287	1.86	0.2344	1.72	0.2164	11.43	0.3287	8.15	0.2344	7.52	0.2164
N_2O	0.002	0.0002	0.002	0.0002	0.001	0.0001	0.008	0.0002	0.007	0.0002	0.005	0.0001

Emissions Summary - Worst Case Full Load (100%)								
	One (1) Cat G3516TA - 100%				1 Cat 3516TA - 100%			
	Uncontrolled		Controlled		Uncontrolled		Controlled	
Pollutant	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
NO_x	25.41	111.29	1.13	4.97	25.41	111.29	1.13	4.97
CO	29.72	130.17	3.40	14.90	29.72	130.17	3.40	14.90
NMNEHC	1.59	6.96	1.13	4.97	1.59	6.96	1.13	4.97
SO_2	0.11	0.49	0.11	0.49	0.11	0.49	0.11	0.49
PM_{10}	0.17	0.75	0.17	0.75	0.17	0.75	0.17	0.75
$PM_{2.5}$	0.170	0.745	0.170	0.745	0.170	0.745	0.170	0.745
HCHO	0.11	0.50	0.11	0.50	0.11	0.50	0.11	0.50
CO_2	120.3	526.8	120.3	526.8	120.3	526.8	120.3	526.8
CH_4	3.65	16.00	2.61	11.43	3.65	16.00	2.61	11.43
N_2O	0.002	0.008	0.002	0.008	0.002	0.008	0.002	0.008
CO_2e		865.4 tpy		769.4 tpy		865.4 tpy		769.4 tpy

Sample Calcs:

(bhp) (Btu/bhp-hr) (MM/10^6) = MMBtu/hr; (MMBtu/hr) / (Btu/scf) (10^6/MM) = scf/hr

(g/bhp-hr) (bhp) (lb/453.59 g) = lb/hr; (lb/MMBtu) (MMBtu/hr) = lb/hr; (kg/MMBtu) (MMBtu/hr) (2.2046 lb/kg) = lb/hr

(lb/hr) (hrs/yr) (ton/2000 lb) = tons/yr

(lb/hr) (453.59 g/lb) (hr/60 min) (min/60 sec) = g/sec; (ton/yr) (2,000 lb/ton) (453.59 g/lb) (8760 hr/yr) (hr/60 min) (min/60 sec) = g/sec

Notes:

Hp, fuel consumption & uncontrolled emission factors for NO_x, CO, NMHC from Caterpillar specific technical data sheet, Ref. Data Set DM5172-02, printed 01Feb-99.

1,050 hp 100% load rating * 0.98 de-rate factor @ 7,000 ft and 50 °F inlet temp. Same for 788 hp (75% load) & 525 hp (50% load)

Exhaust flow adjusted for 7,000 ft elevation or 11.5 psia

Controlled emissions for NO_x, CO, VOC, & HCHO are based on proposed WDEQ BACT limits (0.5, 1.0, 0.7, & 0.05 g/bhp-hr)

SO_2 emissions based on sulfur content of gas (5 grains S/100 scf and 100% conversion).

Emission factor for PM_{10} and $PM_{2.5}$ from EPA, AP-42 Chapter 3.2, Table 3.2-3, including PM_{10} and $PM_{2.5}$ filterable plus PM condensable.

Table A-2a *Jonah Energy , LLC - SHB 1-29 Compressor Station*
Gas Compression IC Engine HAP Emissions Calculations

Pollutant	Emission Factor [1]	Uncontrolled Emission Rates		Controlled Emission Rates			1 Engines	
		One Engine		One Engine				
		(lb/hr) [2]	(lbs/yr) [3]	(lb/hr) [2]	(lbs/yr) [3]	(tpy) [4]	(lb/hr)	(tpy)
1,1,2,2-Tetrachloroethane	2.53E-05 lb/MMBtu	0.0002	1.94	0.0002	1.39	0.0007	0.0002	0.0007
1,1,2-Trichloroethane	1.53E-05 lb/MMBtu	0.0001	1.18	0.0001	0.84	0.0004	0.0001	0.0004
1.3-Butadiene	6.63E-04 lb/MMBtu	0.0058	50.92	0.0042	36.37	0.0182	0.0042	0.0182
1,3-Dichloropropene	1.27E-05 lb/MMBtu	0.0001	0.98	0.0001	0.70	0.0003	0.0001	0.0003
Acetaldehyde	2.79E-03 lb/MMBtu	0.0245	214.28	0.0175	153.05	0.0765	0.0175	0.0765
Acrolein	2.63E-03 lb/MMBtu	0.0231	201.99	0.0165	144.28	0.0721	0.0165	0.0721
Benzene	1.58E-03 lb/MMBtu	0.0139	121.35	0.0099	86.68	0.0433	0.0099	0.0433
Carbon Tetrachloride	1.77E-05 lb/MMBtu	0.0002	1.36	0.0001	0.97	0.0005	0.0001	0.0005
Chlorobenzene	1.29E-05 lb/MMBtu	0.0001	0.99	0.0001	0.71	0.0004	0.00	0.00
Chloroform	1.37E-05 lb/MMBtu	0.0001	1.05	0.0001	0.75	0.0004	0.00	0.00
Ethylbenzene	2.48E-05 lb/MMBtu	0.0002	1.90	0.0002	1.36	0.0007	0.0002	0.0007
Formaldehyde [4]	**0.05 g/bhp-hr**	**0.1134**	**993.6330**	**0.1134**	**993.63**	**0.50**	**0.11**	**0.50**
Methanol	3.06E-03 lb/MMBtu	0.0268	235.01	0.0192	167.87	0.0839	0.0192	0.0839
Methylene Chloride	4.12E-05 lb/MMBtu	0.0004	3.16	0.0003	2.26	0.0011	0.0003	0.0011
Naphthalene	9.71E-05 lb/MMBtu	0.0009	7.46	0.0006	5.33	0.0027	0.0006	0.0027
PAH	1.41E-04 lb/MMBtu	0.0012	10.83	0.0009	7.74	0.0039	0.0009	0.0039
Styrene	1.19E-05 lb/MMBtu	0.0001	0.91	0.0001	0.65	0.0003	0.0001	0.0003
Toluene	5.58E-04 lb/MMBtu	0.0049	42.86	0.0035	30.61	0.0153	0.0035	0.0153
Vinyl Chloride	7.18E-06 lb/MMBtu	0.0001	0.55	0.0000	0.39	0.0002	0.0000	0.0002
Xylene	1.95E-04 lb/MMBtu	0.0017	14.98	0.0012	10.70	0.0053	0.0012	0.0053
			Totals	**0.19**	**1,646.3**	**0.82**	**0.19**	**0.82**
			Maximum Individual HAP (HCHO)			**0.50**		**0.50**

Make	Caterpillar		
Model	G3516TA (4SRB)		
Number of IC Engines	1	Heat Input (LHV) [5]	7.92 MMBtu/hr
Hours of Operation	8,760 hr/yr	Heat Input (HHV) [6]	8.77 MMBtu/hr
Horsepower	1,029 bhp	Catalyst CE for HAPs [7]	29%
Specific Fuel Consumption	7,700 Btu/bhp-hr	Catalyst CE for HCHO [7]	0.05 g/bhp-hr

Notes:

[1] Emission factors from AP-42, Section 3.2, Table 3.2-3 (7/00) - 4-stroke rich-burn (4SRB) engines

[2] (MMBtu/hr [HHV]) (lb/MMBtu) = lb/hr; (lb/hr) (100 - % control) / 100 = lb/hr

[3] (b/hr) (8760 hr/yr) / (2,000 lb/ton) = tpy; (tpy) (100 - % control) / 100 = tpy

[4] Formaldehyde emission factor based on WDEQ BACT for 4SRB engine.

[5] LHV heat input rate for the engine is based on LHV fuel consumption rate for one engine from manufacturer spec sheet.
[LHV Btu/bhp-hr] * [bhp] / 1,000,000 = MMBtu/hr

[6] AP-42 EFs are based on HHV, therefore, Heat Input for HHV was used.
[HHV Btu/bhp-hr] * [bhp] / 1,000,000 = MMBtu/hr

[7] Catalyst control efficiency based on manufacturer-specified percent reduction

Table A-3 *Jonah Energy , LLC - SHB 1-29 Compressor Station*
Gas Compression IC Engine Criteria Pollutant Emissions Calculations

Engine Data			
IC Engine Make	Caterpillar	Fuel LHV	1,011 Btu/scf
IC Engine Model	G3516TALE	Fuel HHV	1,119 Btu/scf
Sulfur Content of Fuel	0.0500 gr/scf	Number of Engines	1
Hours per Year	8,760 hr/yr		

Load		100% Max [1]	75% Load	60%
Power Rating		1,340 bhp	838 bhp	670 bhp
Specific Fuel Consumption	LHV	8,506 Btu/bhp-hr	9,043 Btu/bhp-hr	9,215 Btu/bhp-hr
Fuel Consumption (LHV)		11,272.7 scf/hr	7,494.7 scf/hr	6,106.1 scf/hr
Fuel Consumption (LHV)		98.7 MMscf/yr	65.7 MMscf/yr	53.5 MMscf/yr
Duty (input) - HHV		12.61 MMBtu/hr	8.39 MMBtu/hr	6.83 MMBtu/hr
Duty (input) - LHV		11.40 MMBtu/hr	7.58 MMBtu/hr	6.17 MMBtu/hr
Exhaust Stack Temp		983 F	989 F	989 F
Exhaust Gas Flow		9,556 acfm	6,245 acfm	5,024 acfm

Pollutant	Emission Factors @ Loads			Add-On Control & Efficiency	Source
	100% Load	75% Load	60%		
NO_x	0.50 g/bhp-hr	0.50 g/bhp-hr	0.50 g/bhp-hr	Low Emission - part of engine design - WDEQ BACT	
CO	3.84 g/bhp-hr	3.82 g/bhp-hr	3.77 g/bhp-hr	Oxidation Catalyst - 1 g/bhp-hr WDEQ BACT	
NMNEHC	0.70 g/bhp-hr	0.75 g/bhp-hr	0.76 g/bhp-hr	Part of engine design - 0.7 g/bhp-hr WDEQ BACT	
SO_2	0.01276 lb/MMBtu	0.012756 lb/MMBtu	0.012756 lb/MMBtu	None	AP42 Tbl 3.2-2
PM_{10}	0.009987 lb/MMBtu	0.009987 lb/MMBtu	0.009987 lb/MMBtu	None	AP42 Tbl 3.2-2
$PM_{2.5}$	0.009987 lb/MMBtu	0.009987 lb/MMBtu	0.009987 lb/MMBtu	None	AP42 Tbl 3.2-2
HCHO	0.24 g/bhp-hr	0.50 g/bhp-hr	0.51 g/bhp-hr	Oxidation Catalyst	0.07 g/bhp-hr WDEQ BACT
CO_2	575 g/bhp-hr	601 g/bhp-hr	608 g/bhp-hr	None	Manufacturer
CH_4	2.81 g/bhp-hr	3.18 g/bhp-hr	3.24 g/bhp-hr	Low Emission - part of engine design	
N_2O	0.00010 kg/MMBtu	0.00010 kg/MMBtu	0.00010 kg/MMBtu	None	Part 98, Subpart C

One Cat G3516TALE Engine - Controlled Emission Rates - All Loads												
Pollutant	100%		75% Load		60%		100%		75% Load		60%	
	lb/hr	g/s	lb/hr	g/s	lb/hr	g/s	TPY	g/s	TPY	g/s	TPY	g/s
NO_x	1.48	0.1861	0.92	0.1164	0.74	0.0931	6.47	0.1861	4.05	0.1164	3.23	0.0931
CO	2.95	0.3722	1.84	0.2316	1.45	0.1827	12.94	0.3722	8.05	0.2316	6.35	0.1827
NMNEHC	2.07	0.2606	1.39	0.1746	1.12	0.1414	9.06	0.2606	6.07	0.1746	4.92	0.1414
SO_2	0.161	0.0203	0.1070	0.0135	0.0871	0.0110	0.70	0.0203	0.47	0.0135	0.38	0.0110
PM_{10}	0.13	0.0159	0.08	0.0106	0.07	0.0086	0.55	0.0159	0.37	0.0106	0.30	0.0086
$PM_{2.5}$	0.126	0.0159	0.084	0.0106	0.068	0.0086	0.552	0.0159	0.367	0.0106	0.299	0.0086
HCHO	0.21	0.0261	0.27	0.0339	0.22	0.0277	0.91	0.0261	1.18	0.0339	0.96	0.0277
CO_2	1,698.67	214.03	1,110.34	139.90	898.08	113.16	7,440.2	214.03	4,863.3	139.90	3,933.6	113.16
CH_4	8.30	1.0459	5.87	0.7402	4.79	0.6030	36.36	1.0459	25.73	0.7402	20.96	0.6030
N_2O	0.003	0.0004	0.002	0.0002	0.002	0.0002	0.012	0.0004	0.008	0.0002	0.007	0.0002

Emissions Summary - Worst Case Full Load (100%)								
	One (1) Cat G3516TALE - 100%				1 Cat 3516TALE - 100%			
	Uncontrolled		Controlled		Uncontrolled		Controlled	
Pollutant	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
NO_x	1.48	6.47	1.48	6.47	1.48	6.47	1.48	6.47
CO	11.34	49.69	2.95	12.94	11.34	49.69	2.95	12.94
NMNEHC	2.07	9.06	2.07	9.06	2.07	9.06	2.07	9.06
SO_2	0.16	0.70	0.16	0.70	0.16	0.70	0.16	0.70
PM_{10}	0.13	0.55	0.13	0.55	0.13	0.55	0.13	0.55
$PM_{2.5}$	0.126	0.552	0.126	0.552	0.126	0.552	0.126	0.552
HCHO	0.71	3.11	0.21	0.91	0.71	3.11	0.21	0.91
CO_2	1,698.7	7,440.2	1,698.7	7,440.2	1,698.7	7,440.2	1,698.7	7,440.2
CH_4	8.30	36.36	8.30	36.36	8.30	36.36	8.30	36.36
N_2O	0.003	0.012	0.003	0.012	0.003	0.012	0.003	0.012
CO_2e		8,207.5 tpy		8,207.5 tpy		8,207.5 tpy		8,207.5 tpy

Sample Calcs:

(bhp) (Btu/bhp-hr) (MM/10^6) = MMBtu/hr; (MMBtu/hr) / (Btu/scf) (10^6/MM) = scf/hr

(g/bhp-hr) (bhp) (lb/453.59 g) = lb/hr; (lb/MMBtu) (MMBtu/hr) = lb/hr; (kg/MMBtu) (MMBtu/hr) (2.2046 lb/kg) = lb/hr

(lb/hr) (hrs/yr) (ton/2000 lb) = tons/yr

(lb/hr) (453.59 g/lb) (hr/60 min) (min/60 sec) = g/sec; (ton/yr) (2,000 lb/ton) (453.59 g/lb) (8760 hr/yr) (hr/60 min) (min/60 sec) = g/sec

Notes:

Hp, fuel consumption & uncontrolled emission factors for NO_x, CO, NMNEHC & HCHO from Caterpillar specific technical data sheet, Ref. Data Set DM9400-02-001, printed 22Jul2015.

Controlled emissions for NO_x, CO, VOC, & HCHO are based on proposed WDEQ BACT limits (0.5, 1.0, 0.7, & 0.07 g/bhp-hr)

SO_2 emissions based on sulfur content of gas (5 grains S/100 scf and 100% conversion).

Emission factor for PM_{10} and $PM_{2.5}$ from EPA, AP-42 Chapter 3.2, Table 3.2-2, including PM_{10} and $PM_{2.5}$ filterable plus PM condensable.

Table A-3a *Jonah Energy , LLC - SHB 1-29 Compressor Station*
Gas Compression IC Engine HAP Emissions Calculations

Pollutant	Emission Factor [1]	Uncontrolled Emission Rates		Controlled Emission Rates				
		One Engine		One Engine			1 Engines	
		(lb/hr) [2]	(tpy) [3]	(lb/hr) [2]	(lbs/yr)	(tpy) [3]	(lb/hr)	(tpy)
1,1,2,2-Tetrachloroethane	4.00E-05 lb/MMBtu	0.0005	0.0022	0.0005	4.42	0.0022	0.0005	0.0022
1,1,2-Trichloroethane	3.18E-05 lb/MMBtu	0.0004	0.0018	0.0004	3.51	0.0018	0.0004	0.0018
1.3-Butadiene	2.67E-04 lb/MMBtu	0.0034	0.0147	0.0034	29.50	0.0147	0.0034	0.0147
1,3-Dichloropropene	2.64E-05 lb/MMBtu	0.0003	0.0015	0.0003	2.92	0.0015	0.0003	0.0015
2-Methylnaphthalene	3.32E-05 lb/MMBtu	0.0004	0.0018	0.0004	3.67	0.0018	0.0004	0.0018
2,2,4-Trimethylpentane	2.50E-04 lb/MMBtu	0.0032	0.0138	0.0032	27.62	0.0138	0.0032	0.0138
Acenaphthene	1.25E-06 lb/MMBtu	0.0000	0.0001	0.0000	0.14	0.0001	0.0000	0.0001
Acenaphthylene	5.53E-06 lb/MMBtu	0.0001	0.0003	0.0001	0.61	0.0003	0.0001	0.0003
Acetaldehyde	8.36E-03 lb/MMBtu	0.1054	0.4618	0.1054	923.64	0.4618	0.11	0.46
Acrolein	5.14E-03 lb/MMBtu	0.0648	0.2839	0.0648	567.88	0.2839	0.06	0.28
Benzene	4.40E-04 lb/MMBtu	0.0055	0.0243	0.0055	48.61	0.0243	0.0055	0.0243
Benzo(b)fluoranthene	1.66E-07 lb/MMBtu	0.0000	0.0000	0.0000	0.02	0.0000	0.0000	0.0000
Benzo(e)pyrene	4.15E-07 lb/MMBtu	0.0000	0.0000	0.0000	0.05	0.0000	0.0000	0.0000
Benzo(g,h,i)perylene	4.14E-07 lb/MMBtu	0.0000	0.0000	0.0000	0.05	0.0000	0.0000	0.0000
Biphenyl	2.12E-04 lb/MMBtu	0.0027	0.0117	0.0027	23.42	0.0117	0.0027	0.0117
Carbon Tetrachloride	3.67E-05 lb/MMBtu	0.0005	0.0020	0.0005	4.05	0.0020	0.0005	0.0020
Chlorobenzene	3.04E-05 lb/MMBtu	0.0004	0.0017	0.0004	3.36	0.0017	0.0004	0.0017
Chloroform	2.85E-05 lb/MMBtu	0.0004	0.0016	0.0004	3.15	0.0016	0.0004	0.0016
Chrysene	6.93E-07 lb/MMBtu	0.0000	0.0000	0.0000	0.08	0.0000	0.0000	0.0000
Ethylbenzene	3.97E-05 lb/MMBtu	0.0005	0.0022	0.0005	4.39	0.0022	0.0005	0.0022
Ethylene Dibromide	4.43E-05 lb/MMBtu	0.0006	0.0024	0.0006	4.89	0.0024	0.0006	0.0024
Fluoranthene	1.11E-06 lb/MMBtu	0.0000	0.0001	0.0000	0.12	0.0001	0.0000	0.0001
Fluorene	5.67E-06 lb/MMBtu	0.0001	0.0003	0.0001	0.63	0.0003	0.0001	0.0003
Formaldehyde [4]	**0.24 g/bhp-hr**	**0.7090**	**3.1055**	**0.2068**	**1,811.52**	**0.91**	**0.21**	**0.91**
Methanol	2.50E-03 lb/MMBtu	0.0315	0.1381	0.0315	276.21	0.1381	0.0315	0.1381
Methylene Chloride	2.00E-05 lb/MMBtu	0.0003	0.0011	0.0003	2.21	0.0011	0.0003	0.0011
Hexane	1.11E-03 lb/MMBtu	0.0140	0.0613	0.0140	122.64	0.0613	0.0140	0.0613
Naphthalene	7.44E-05 lb/MMBtu	0.0009	0.0041	0.0009	8.22	0.0041	0.0009	0.0041
PAH	2.69E-05 lb/MMBtu	0.0003	0.0015	0.0003	2.97	0.0015	0.0003	0.0015
Phenanthrene	1.04E-05 lb/MMBtu	0.0001	0.0006	0.0001	1.15	0.0006	0.0001	0.0006
Phenol	2.40E-05 lb/MMBtu	0.0003	0.0013	0.0003	2.65	0.0013	0.0003	0.0013
Pyrene	1.36E-06 lb/MMBtu	0.0000	0.0001	0.0000	0.15	0.0001	0.0000	0.0001
Styrene	2.36E-05 lb/MMBtu	0.0003	0.0013	0.0003	2.61	0.0013	0.0003	0.0013
Tetrachloroethane	2.48E-06 lb/MMBtu	0.0000	0.0001	0.0000	0.27	0.0001	0.0000	0.0001
Toluene	4.08E-04 lb/MMBtu	0.0051	0.0225	0.0051	45.08	0.0225	0.0051	0.0225
Vinyl Chloride	1.49E-05 lb/MMBtu	0.0002	0.0008	0.0002	1.65	0.0008	0.0002	0.0008
Xylene	1.84E-04 lb/MMBtu	0.0023	0.0102	0.0023	20.33	0.0102	0.0023	0.0102
			Totals	0.45	3,954.4	1.98	0.45	1.98
			Maximum Individual HAP (HCHO)			0.91		0.91

Make	Caterpillar		
Model	G3516TALE		
Number of IC Engines	1	Heat Input (LHV) [5]	11.40 MMBtu/hr
Hours of Operation	8,760 hr/yr	Heat Input (HHV) [6]	12.61 MMBtu/hr
Horsepower	1,340 bhp	Catalyst CE for HAPs [7]	0%
Specific Fuel Consumption	8,506 Btu/bhp-hr	Catalyst CE for HCHO [7]	0.07 g/bhp-hr

Notes:

[1] Emission factors from AP-42, Section 3.2, Table 3.2-2 (7/00), except for formaldehyde.

[2] (MMBtu/hr [HHV]) (lb/MMBtu) = lb/hr; (lb/hr) (100 - % control) / 100 = lb/hr

[3] (b/hr) (8760 hr/yr) / (2,000 lb/ton) = tpy; (tpy) (100 - % control) / 100 = tpy

[4] Formaldehyde emission factor from manufacturer's emission factor, Ref. Data Set DM8800-04-002, printed 14Oct2010

[5] LHV heat input rate for the engine is based on LHV fuel consumption rate for one engine from manufacturer spec sheet.
[LHV Btu/bhp-hr] * [bhp] / 1,000,000 = MMBtu/hr

[6] AP-42 EFs are based on HHV, therefore, Heat Input for HHV was used.
[HHV Btu/bhp-hr] * [bhp] / 1,000,000 = MMBtu/hr

[7] Catalyst control efficiency based on manufacturer-specified percent reduction

Table A-4 Jonah Energy , LLC - SHB 1-29 Compressor Station
Natural Gas-Fired Heater Treater Criteria Pollutant Emissions Calculations

Emission Source:	Separator Heater
Source Type:	Natural Gas-Fired Heater
Heat Input:	1.00 MMBtu/hr
Natural Gas Higher Heating Value (HHV):	1,119 Btu/scf
Fuel Consumption (HHV):	0.0009 MMscf/hr
Fuel Consumption (HHV):	7.83 MMscf/yr
Operating Hours per Year:	8,760 hr/yr
Sulfur Content of Fuel:	0.0500 gr/scf
Exhaust Stack Temp:	601 F
Exhaust Gas Flow:	647 acfm
Number of Units:	2

Pollutant	Emission Factors [1]	One Heater			
		Short-term		Annual	
		lb/hr [2]	g/sec	tpy [3]	g/sec
NO_x	100.0 lb/MMscf	0.09	0.0113	0.39	0.0113
CO	84.0 lb/MMscf	0.08	0.0095	0.33	0.0095
VOC	5.5 lb/MMscf	0.005	0.0006	0.02	0.0006
SO_2	0.013 lb/MMBtu	0.00001	0.0000	0.00005	0.0000
PM_{10}	7.6 lb/MMscf	0.01	0.0009	0.03	0.0009
$PM_{2.5}$	7.6 lb/MMscf	0.01	0.0009	0.03	0.0009
CO_2	53.02 kg/MMBtu	116.9	14.73	512.0	14.73
CH_4	0.001 kg/MMBtu	0.002	0.0003	0.010	0.0003
N_2O	0.0001 kg/MMBtu	0.000	0.0000	0.001	0.0000
			CO_2e		512.5 tpy

Notes:

[1] Emission factors (lb/MMscf) based on USEPA AP-42, Section 1.4, Table 1.4-2, dated July 1998

AP42 Tble 1.4-2 indicates that all PM (total, condensible, and filterable) is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emission factors presented here may be used to estimate PM_{10}, $PM_{2.5}$ or PM_1 emissions.

[2] Hourly Emission Rate (lb/hr) = (lb/MMscf) * (MMscf/hr); or (kg/MMBtu) (MMBtu/hr) (2.2046 lb/kg)

[3] Annual Emission Rate (tpy) = (lb/hr) (hrs/yr) (ton/2000 lb)

Table A-4a *Jonah Energy , LLC - SHB 1-29 Compressor Station*
Natural Gas-Fired Heater Treater HAP Emissions Calculations

Pollutant	Type [1]	Emission Factor (lb/MMscf) [2]	Emission Rates One Heater (lb/hr) [3]	(lbs/yr)	(tpy) [4]
2-Methylnaphthalene	HAP	2.4E-05	2.15E-08	1.88E-04	9.40E-08
3-Methylchloranthrene	HAP	1.8E-06	1.61E-09	1.41E-05	7.05E-09
7,12-Dimethylbenz(a)anthracene	HAP	1.6E-05	1.43E-08	1.25E-04	6.26E-08
Acenaphthene	HAP	1.8E-06	1.61E-09	1.41E-05	7.05E-09
Acenaphthylene	HAP	1.8E-06	1.61E-09	1.41E-05	7.05E-09
Anthracene	HAP	2.4E-06	2.15E-09	1.88E-05	9.40E-09
Benz(a)anthracene	HAP	1.8E-06	1.61E-09	1.41E-05	7.05E-09
Benzene	HAP	2.1E-03	1.88E-06	1.64E-02	8.22E-06
Benzo(a)pyrene	HAP	1.2E-06	1.07E-09	9.40E-06	4.70E-09
Benzo(b)fluoranthene	HAP	1.8E-06	1.61E-09	1.41E-05	7.05E-09
Benzo(g,h,i)perylene	HAP	1.2E-06	1.07E-09	9.40E-06	4.70E-09
Benzo(k)fluoranthene	HAP	1.8E-06	1.61E-09	1.41E-05	7.05E-09
Chrysene	HAP	1.8E-06	1.61E-09	1.41E-05	7.05E-09
Dibenzo(a,h)anthracene	HAP	1.2E-06	1.07E-09	9.40E-06	4.70E-09
Dichlorobenzene	HAP	1.2E-03	1.07E-06	9.40E-03	4.70E-06
Fluoranthene	HAP	3.0E-06	2.68E-09	2.35E-05	1.17E-08
Fluorene	HAP	2.8E-06	2.50E-09	2.19E-05	1.10E-08
Formaldehyde	HAP	7.5E-02	6.70E-05	5.87E-01	2.94E-04
n-Hexane	HAP	1.8E+00	1.61E-03	1.41E+01	**7.05E-03**
Indeno(1,2,3-cd)pyrene	HAP	1.8E-06	1.61E-09	1.41E-05	7.05E-09
Naphthalene	HAP	6.1E-04	5.45E-07	4.78E-03	2.39E-06
Phenanathrene	HAP	1.7E-05	1.52E-08	1.33E-04	6.66E-08
Pyrene	HAP	5.0E-06	4.47E-09	3.91E-05	1.96E-08
Toluene	HAP	3.4E-03	3.04E-06	2.66E-02	1.33E-05
					7.37E-03

Natural Gas-Fired Heater	8,760 hr/yr	**Total HAPs**	**0.007 tpy**
Maximum Heat Input	1.00 MMBtu/hr	**Max HAP**	**0.007 tpy**
Natural Gas Heating Value	1,119 Btu/scf		
Fuel Consumption (LHV)	0.0009 MMscf/hr		
Fuel Consumption (LHV)	7.83 MMscf/yr		
Number of Heaters	2		

Notes:

[1] Type = HAP for Hazardous Air Pollutant.

[2] Emission factors from AP-42, Section 1.4, Table 1.4-3 (7/98).

[3] Hourly Emission Rate (lb/hr) = [(MMBtu/Hr) * (lb/MMscf)] / [(BTU/scf)]

[4] Annual Emission Rate (tpy) = (lb/hr) * (8760 hr/yr) / (2,000 lb/ton)

G3516 TA GAS ENGINE TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED:	1200	FUEL:	NAT GAS
COMPRESSION RATIO:	9.0:1	FUEL SYSTEM:	HPG IMPCO
AFTERCOOLER (°F)	130		WITH AIR FUEL RATIO CONTROL
JACKET WATER (°F)	210	MIN. FUEL PRESS. (PSIG):	25
COOLING SYSTEM:	COMBINED	MIN. METHANE NUMBER:	80
IGNITION SYSTEM:	EIS	RATED ALTITUDE (FT):	5000
EXHAUST MANIFOLD:	WET	AT AMBIENT TEMP (°F):	77
COMBUSTION:	STOICH	NOx EMISSION LEVEL:	CATALYST
		PRICE LIST SETTING:	PA-4880

RATING AND EFFICIENCY	NOTES	LOAD	100%	75%	50%
LHV OF FUEL		BTU/SCF	920	920	920
ENGINE POWER		BHP	1050	788	525
ENGINE EFFICIENCY	(1)	%	33.1	31.5	27.7
THERMAL EFFICIENCY	(6)	%	54.6	56.5	61.0
TOTAL EFFICIENCY	(7)	%	87.7	88.1	88.7

ENGINE DATA					
FUEL CONSUMPTION	(1)	BTU/bhp-hr	7700	8080	9196
AIR FLOW (77 °F, 14.7 psi)	(WET)	SCFM	1365	1046	732
AIR FLOW	(WET)	lb/hr	6054	4639	3246
COMPRESSOR OUT PRESS.		in. HG (abs)	60.9	58	52.4
COMPRESSOR OUT TEMP.		°F	257	238	209
INLET MAN. PRESS.		in. HG (abs)	54.5	46	38.5
INLET MAN. TEMP.	(11)	°F	133	133	131
TIMING	(12)	°BTDC	23	23	23
NOISE - MECH @ 1m		dB(A)	100	99	98
NOISE - EXH @ 1.5m		dB(A)	111	110	109
EXHAUST STACK TEMP.		°F	912	855	786
EXHAUST GAS FLOW (@ stack temp.)	(WET)	CFM, 14.5 psi	3893	2863	1905
EXHAUST MASS	(WET)	lb/hr	6449	4951	3476

EMISSIONS DATA					
NOx (as NO2)	(10)	g/bhp-hr	11.2	12.1	11.1
CO	(10)	g/bhp-hr	13.1	10.2	16.2
THC	(10)	g/bhp-hr	1.9	1.8	2.5
NMHC	(10)	g/bhp-hr	0.29	0.27	0.38
EXHAUST O2	(10)	%	0.3	0.2	0.2
LAMBDA			1.01	1.02	1.01

HEAT BALANCE DATA					
LHV INPUT	(1)	BTU/min	134750	106052	80463
HEAT REJ. TO JACKET	(2) (8)	BTU/min	48958	41715	36270
HEAT REJ. TO ATMOSPHERE	(4)	BTU/min	4554	3795	3037
HEAT REJ. TO LUBE OIL	(5)	BTU/min	7731	6588	5728
HEAT REJ. TO EXH. (LHV to 77°F)	(2)	BTU/min	25989	18587	12129
HEAT REJ. TO EXH. (LHV to 350°F)	(2)	BTU/min	16938	11665	7086
HEAT REJ. TO A/C	(3) (9)	BTU/min	2968	1955	1025

CONDITIONS AND DEFINITIONS

ENGINE RATING OBTAINED AND PRESENTED IN ACCORDANCE WITH ISO 3046/1 (STD. REF. CONDITIONS OF 25°C, 100 KPA). NO OVERLOAD PERMITTED AT RATING SHOWN. CONSULT ALTITUDE CURVES FOR APPLICATIONS ABOVE MAXIMUM RATED ALTITUDE AND/OR TEMPERATURE.

NOTES

1) FUEL CONSUMPTION TOLERANCE ACCORDING TO ISO 3046/1. TOLERANCE IS + 5% OF FULL LOAD DATA.
2) HEAT REJECTION TO JACKET AND EXHAUST TOLERANCE IS ± 10% OF FULL LOAD DATA.
3) HEAT REJECTION TO A/C TOLERANCE IS ± 5% OF FULL LOAD DATA.
4) HEAT REJECTION TO ATMOSPHERE TOLERANCE IS ± 50% OF FULL LOAD DATA.
5) HEAT REJECTION TO LUBE OIL TOLERANCE IS ± 20% OF FULL LOAD DATA.
6) THERMAL EFFICIENCY: JACKET HEAT + LUBE OIL HEAT + EXH. HEAT TO 350°F.
7) TOTAL EFFICIENCY: ENGINE EFF. + THERMAL EFF. TOLERANCE IS ± 10% OF FULL LOAD DATA.
8) TOTAL JW HEAT: COMBINED = JACKET HEAT + OIL COOLER HEAT (heat rate based on treated water)
   2-CIRCUIT AND 3 CIRCUIT = JACKET HEAT (heat rate based on treated water)
9) TOTAL A/C HEAT: COMBINED AND 3-CIRCUIT = A/C HEAT x A/C HEAT REJ. FACTOR (heat rate based on treated water)
   2-CIRCUIT = A/C HEAT x A/C HEAT REJ. FACTOR + O/C HEAT

10) EMISSION DATA SHOWN ARE DRY AND NOT TO EXCEED VALUES.
    PUBLISHED PART LOAD DATA REQUIRES AIR FUEL RATIO CONTROL.
11) MEASURED IN THE INTAKE MANIFOLD PLENUM.
12) TIMING INDICATED IS FOR USE WITH THE MINIMUM FUEL METHANE NUMBER SPECIFIED. CONSULT THE APPROPRIATE FUEL USAGE GUIDE FOR TIMING AT OTHER METHANE NUMBERS.

FUEL USAGE GUIDE

DERATE FACTOR/ENGINE TIMING vs METHANE NUMBER

<30	30	40	49	50	60	64	65	70	75	80	83 to 100
0/--	0.59/14	0.59/16	0.59/18	0.90/14	0.90/16	0.90/17	1.0/16	1.0/18	1.0/21	1.0/22	1.0/23

* Denotes Air Fuel Ratio Control Required for Maximum Rating Shown.

ALTITUDE DERATION FACTORS

		0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
A	130	1.00	1.00	1.00	0.98	0.94	0.91	0.88	0.84	0.81	0.78	0.75	0.72	0.70
M	120	1.00	1.00	1.00	1.00	0.96	0.93	0.89	0.86	0.83	0.80	0.77	0.74	0.71
B	110	1.00	1.00	1.00	1.00	0.98	0.94	0.91	0.87	0.84	0.81	0.78	0.75	0.72
I	100	1.00	1.00	1.00	1.00	1.00	0.96	0.92	0.89	0.86	0.82	0.79	0.76	0.73
E	90	1.00	1.00	1.00	1.00	1.00	0.98	0.94	0.91	0.87	0.84	0.81	0.78	0.75
N	80	1.00	1.00	1.00	1.00	1.00	0.99	0.96	0.92	0.89	0.85	0.82	0.79	0.76
T	70	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.94	0.90	0.87	0.84	0.81	0.77
	60	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.96	0.92	0.89	0.85	0.82	0.79
(°F)	50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.94	0.90	0.87	0.84	0.80

ALTITUDE (FEET ABOVE SEA LEVEL)

AFTERCOOLER HEAT REJECTION FACTORS

		0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
A	130	1.43	1.51	1.60	1.69	1.77	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
M	120	1.33	1.41	1.49	1.58	1.66	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
B	110	1.22	1.30	1.38	1.47	1.55	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
I	100	1.12	1.20	1.28	1.36	1.44	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
E	90	1.01	1.09	1.17	1.25	1.33	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41
N	80	1.00	1.00	1.06	1.14	1.22	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
T	70	1.00	1.00	1.00	1.03	1.11	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
	60	1.00	1.00	1.00	1.00	1.00	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
(°F)	50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

ALTITUDE (FEET ABOVE SEA LEVEL)

FUEL USAGE GUIDE:

This table shows the derate factor required for a given fuel and what engine timing to use. Note that deration occurs as the methane number decreases. Methane number is a scale to measure ignition and burning characteristics of various fuels. Representative values are shown below.

Methane	100
Ethane	44
Propane	34
n-Butane	10
Hydrogen	0

Most dry pipeline natural gas has a methane number of 67 or above. The gas quality should be analyzed to determine the percentage of each constituent and then determine the methane number. Consult the dealer or factory for assistance.

ALTITUDE DERATION FACTORS:

This table shows the deration required for various ambient temperatures and altitudes. Use this information to help determine actual engine power for your site.

ACTUAL ENGINE RATING:

It is important to note that the Altitude/Temperature deration and the Fuel Usage Guide deration are not cumulative, i.e., they are not to be added together. The same is true for the Low Energy Fuel deration (reference the Caterpillar Methane Number Program) and the Fuel Usage Guide deration. However, the Altitude/Temperature deration and Low Energy Fuel deration are cumulative; and they must be added together in the method shown below. To determine the actual power available, take the lowest rating between 1) and 2).

1) (Altitude/Temperature Deration) + (Low Energy Fuel Deration)
2) Fuel Usage Guide Deration

Note: For NA's always add the Low Energy Fuel deration to the Altitude/Temperature deration. For TA engines only add the Low Energy Fuel deration to the Altitude/Temperature deration whenever the Altitude/Temperature deration is less than 1.0 (100%). This will give the actual rating for the engine at the conditions specified.

AFTERCOOLER HEAT REJECTION FACTORS:

Aftercooler heat rejection is given for standard conditions of 77°F and 500 ft altitude. To maintain a constant inlet air manifold temperature, as the ambient air temperature goes up, so must the heat rejection. As altitude increases, the turbocharger must work harder to overcome the lower atmospheric pressure. This increases the amount of heat that must be removed from the inlet air by the aftercooler. Use the aftercooler heat rejection factor to adjust for ambient and altitude conditions. Multiply this factor by the standard aftercooler heat rejection. Failure to properly account for these factors could result in detonation and cause the engine to shut down or fail.

G3516

CATERPILLAR®

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
Jonah Energy
SHB compression

GAS COMPRESSION APPLICATION

ENGINE SPEED (rpm):	1400	RATING STRATEGY:	LOW NOX UPGRADE
COMPRESSION RATIO:	8:1	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	HPG IMPCO WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 2 INLET (°F):	130		
AFTERCOOLER - STAGE 1 INLET (°F):	201	SITE CONDITIONS:	
JACKET WATER OUTLET (°F):	210	FUEL:	Field Gas
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig):	40.0-45.0
COOLING SYSTEM:	JW+OC+1AC, 2AC	FUEL METHANE NUMBER:	62.1
CONTROL SYSTEM:	ADEM3	FUEL LHV (Btu/scf):	1027
EXHAUST MANIFOLD:	ASWC	ALTITUDE(ft):	7200
COMBUSTION:	LOW EMISSION	MAXIMUM INLET AIR TEMPERATURE(°F):	100
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	STANDARD RATED POWER:	1340 bhp@1400rpm
SET POINT TIMING:	28		

			MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING	**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**60%**
ENGINE POWER (WITHOUT FAN)	(1)	bhp	1340	1117	838	670
INLET AIR TEMPERATURE		°F	45	100	100	100
ENGINE DATA						
FUEL CONSUMPTION (LHV)	(2)	Btu/bhp-hr	8506	8741	9043	9215
FUEL CONSUMPTION (HHV)	(2)	Btu/bhp-hr	9399	9659	9992	10183
AIR FLOW (@inlet air temp, 14.7 psia) (WET)	(3)(4)	ft3/min	3101	2928	2235	1797
AIR FLOW (WET)	(3)(4)	lb/hr	14625	12450	9503	7640
FUEL FLOW (60°F, 14.7 psia)		scfm	185	158	123	100
INLET MANIFOLD PRESSURE	(5)	in Hg(abs)	76.2	67.0	52.6	42.8
EXHAUST TEMPERATURE - ENGINE OUTLET	(6)	°F	983	986	989	989
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia) (WET)	(7)(4)	ft3/min	9556	8157	6245	5024
EXHAUST GAS MASS FLOW (WET)	(7)(4)	lb/hr	15174	12921	9868	7938
EMISSIONS DATA - ENGINE OUT						
NOx (as NO2)	(8)(9)	g/bhp-hr	0.50	0.50	0.50	0.50
CO	(8)(9)	g/bhp-hr	3.84	3.86	3.82	3.77
THC (mol. wt. of 15.84)	(8)(9)	g/bhp-hr	3.80	4.06	4.29	4.38
NMHC (mol. wt. of 15.84)	(8)(9)	g/bhp-hr	0.99	1.05	1.11	1.14
NMNEHC (VOCs) (mol. wt. of 15.84)	(8)(9)(10)	g/bhp-hr	0.66	0.71	0.75	0.76
HCHO (Formaldehyde)	(8)(9)	g/bhp-hr	0.24	0.40	0.50	0.51
CO2	(8)(9)	g/bhp-hr	575	587	601	608
EXHAUST OXYGEN	(8)(11)	% DRY	8.3	8.2	8.0	7.8
HEAT REJECTION						
HEAT REJ. TO JACKET WATER (JW)	(12)	Btu/min	43505	39687	33729	29028
HEAT REJ. TO ATMOSPHERE	(12)	Btu/min	5313	4726	3987	3543
HEAT REJ. TO LUBE OIL (OC)	(12)	Btu/min	6488	5919	5030	4329
HEAT REJ. TO A/C - STAGE 1 (1AC)	(12)(13)	Btu/min	14756	14756	5145	2565
HEAT REJ. TO A/C - STAGE 2 (2AC)	(12)(13)	Btu/min	4829	4829	3121	2507

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+OC+1AC)	(13)(14)	Btu/min	71134
TOTAL AFTERCOOLER CIRCUIT (2AC)	(13)(14)	Btu/min	5070
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

CONDITIONS AND DEFINITIONS

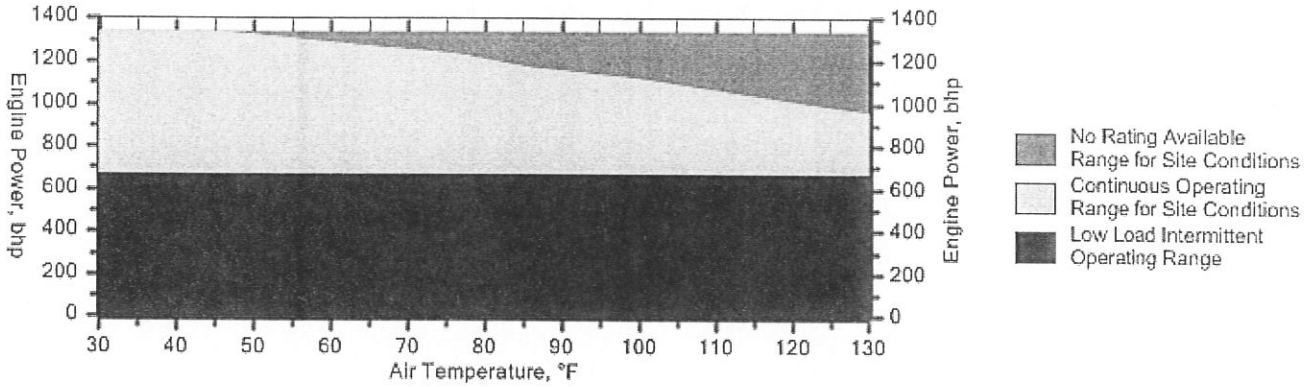
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability at the specified aftercooler inlet temperature for the specified fuel at site altitude and reduced inlet air temperature. Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.

PREPARED BY: Mike Bailey, J-W Power Company
Data generated by Gas Engine Rating Pro Version 5.04.00
Ref. Data Set DM9400-02-001, Printed 22Jul2015

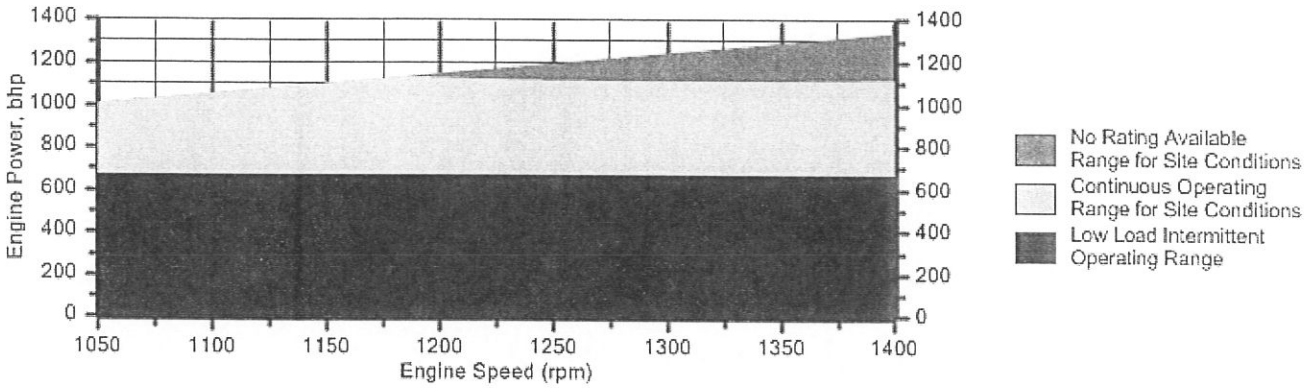
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 7200 ft and 1400 rpm



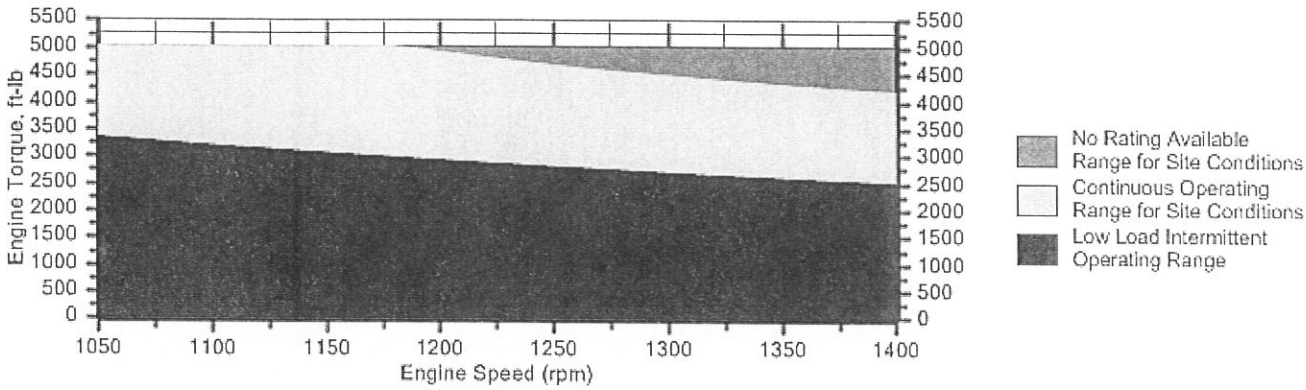
Engine Power vs. Engine Speed

Data represents speed sweep at 7200 ft and 100 °F



Engine Torque vs. Engine Speed

Data represents speed sweep at 7200 ft and 100 °F



Note: At site conditions of 7200 ft and 100°F inlet air temp., constant torque can be maintained down to 1050 rpm. The minimum speed for loading at these conditions is 1050 rpm.

NOTES

1. Engine rating is with two engine driven water pumps. Tolerance is ± 3% of full load.

2. Fuel consumption tolerance is ± 3.0% of full load data.

3. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.

4. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.

5. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.

6. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.

7. Exhaust flow value is on a "wet" basis. Flow is a nominal value with a tolerance of ± 6 %.

8. Emissions data is at engine exhaust flange prior to any after treatment.

9. Emission values are based on engine operating at steady state conditions. Fuel methane number cannot vary more than ± 3. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate "Not to Exceed" values. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.

10. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ

11. Exhaust Oxygen level is the result of adjusting the engine to operate at the specified NOx level. Tolerance is ± 0.5.

12. Heat rejection values are nominal. Tolerances, based on treated water, are ± 10% for jacket water circuit, ± 50% for radiation, ± 20% for lube oil circuit, and ± 5% for aftercooler circuit.

13. Aftercooler heat rejection includes an aftercooler heat rejection factor for the site elevation and inlet air temperature specified. Aftercooler heat rejection values at part load are for reference only. Do not use part load data for heat exchanger sizing.

14. Cooling system sizing criteria are maximum circuit heat rejection for the site, with applied tolerances.

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	2.5211	2.5211
Methane	CH4	86.6340	86.6340
Ethane	C2H6	4.9767	4.9767
Propane	C3H8	3.5670	3.5670
Isobutane	iso-C4H1O	0.0000	0.0000
Norbutane	nor-C4H1O	1.8211	1.8211
Isopentane	iso-C5H12	0.0000	0.0000
Norpentane	nor-C5H12	0.4802	0.4802
Hexane	C6H14	0.0000	0.0000
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	0.0000	0.0000
Carbon Dioxide	CO2	0.0000	0.0000
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0000	0.0000
Hydrogen	H2	0.0000	0.0000
Oxygen	O2	0.0000	0.0000
Helium	HE	0.0000	0.0000
Neopentane	neo-C5H12	0.0000	0.0000
Octane	C8H18	0.0000	0.0000
Nonane	C9H20	0.0000	0.0000
Ethylene	C2H4	0.0000	0.0000
Propylene	C3H6	0.0000	0.0000
TOTAL (Volume %)		100.0000	100.0000

Fuel Makeup:	Field Gas
Unit of Measure:	English
Calculated Fuel Properties	
Caterpillar Methane Number:	62.1
Lower Heating Value (Btu/scf):	1027
Higher Heating Value (Btu/scf):	1135
WOBBE Index (Btu/scf):	1274
THC: Free Inert Ratio:	Not Applicable
Total % Inerts (% N2, CO2, He):	0%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.997
Stoich A/F Ratio (Vol/Vol):	10.68
Stoich A/F Ratio (Mass/Mass):	16.43
Specific Gravity (Relative to Air):	0.650
Specific Heat Constant (K):	1.297

CONDITIONS AND DEFINITIONS

Caterpillar Methane Number represents the knock resistance of a gaseous fuel. It should be used with the Caterpillar Fuel Usage Guide for the engine and rating to determine the rating for the fuel specified. A Fuel Usage Guide for each rating is included on page 2 of its standard technical data sheet.

RPC always applies to naturally aspirated (NA) engines, and turbocharged (TA or LE) engines only when they are derated for altitude and ambient site conditions.

Project specific technical data sheets generated by the Caterpillar Gas Engine Rating Pro program take the Caterpillar Methane Number and RPC into account when generating a site rating.

Fuel properties for Btu/scf calculations are at 60F and 14.696 psia.

Caterpillar shall have no liability in law or equity, for damages, consequently or otherwise, arising from use of program and related material or any part thereof.

FUEL LIQUIDS

Field gases, well head gases, and associated gases typically contain liquid water and heavy hydrocarbons entrained in the gas. To prevent detonation and severe damage to the engine, hydrocarbon liquids must not be allowed to enter the engine fuel system. To remove liquids, a liquid separator and coalescing filter are recommended, with an automatic drain and collection tank to prevent contamination of the ground in accordance with local codes and standards.

To avoid water condensation in the engine or fuel lines, limit the relative humidity of water in the fuel to 80% at the minimum fuel operating temperature.

ATTACHMENT C - IMPACT Application Forms

Revised 6/30/2015

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

Air Quality Division

New Source Review Permit Application Form Cover Sheet

Is this supplemental information to an application currenlty under review?

Yes X No

Previous Application #: AP-A0000944

Date of Application: 8/19/2015

COMPANY INFORMATION:

Company Name: Jonah Energy LLC
Address: 707 17th Street, Suite 2700
City: Denver State: Colorado Zip Code: 80202
Country: USA Phone Number: 720.577.1000

FACILITY INFORMATION:

Facility Name: Stud Horse Butte 1-29 - Compressor Engine
New Facility or Existing Facility: New
Facility Description: Compressor Engine Installation as part of Line Pressure Reduction Project
Facility Class: Minor Operating Status: Not Yet Installed
Facility Type: Production Site

For Oil & Gas Production Sites ONLY:
First Date of Production (FDOP)/Date of Modification: N/A
Single well or multiple well facility?
Does production at this facility contain H2S?* No
If yes, contact the Division.
API Number(s):

NAICS Code: 211111 Crude Petroleum and Natural Gas Extraction

FACILITY LOCATION:

*Enter the facility location in either the latitude/longitude area or section/township/range area. Both are not required.

Physical Address:
City: Zip Code:
State: WY County:

OR

Latitude: 42.45861 Longitude: -109.734722 County: Sublette
Quarter Quarter: NE Quarter: NE
Section: 29 Township: 29N Range: 108W

For longitude and latitude, use NAD 83/WGS84 datum and 5 digits after the decimal (i.e. 41.12345, -107.56789)

CONTACT INFORMATION:

*Note that an Environmental AND NSR Permitting Contact is required for your application to be deemed complete by the agency.

Title: Mr. First Name: Charles
Last Name: Cornell
Company Name: Jonah Energy LLC
Job Title: Sr. Regulatory Lead
Address: 707 17th Street, Suite 2700
City: Denver State: Colorado
Zip Code: 80202
Primary Phone No.: 720.577.1251 E-mail: chuck.cornell@jonahenergy.com
Mobile Phone No.: 970.988.6067 Fax No.:
Contact Type: Environmental contact Start Date: October 6, 2014

*Name of the contact to whom the permit will be issued:

Revised 6/30/2015

Additional Contact Type (if needed): NSR Permitting contact
Title: First Name:
Last Name:
Company Name:
Job Title:
Address:
City: State:
Zip Code:
Primary Phone No.: E-mail:
Mobile Phone No.: Fax No.:
Contact Type: Start Date:

FACILITY APPLICATION INFORMATION:

General Info:

Has the facility changed location or is it a new/ greenfield facility?	No
Has a Land Use Planning document been included in this application?	No
Is the facility located in a sage grouse core area?*	No
If the facility is in a sage grouse core area, what is the WER number?	

** For questions about sage grouse core area, contact WY Game & Fish Department.*

Federal Rules Applicability - Facility Level:

Prevention of Significant Deterioration (PSD):	No
Non-Attainment New Source Review:	No

Modeling Section:

Has the Air Quality Division been contacted to determine if modeling is required?	Yes
Is a modeling analysis part of this application?	Yes
Is the proposed project subject to Prevention of Significant Deterioration (PSD) requirements?	No
Has the Air Quality Division been notified to schedule a pre-application meeting?	No
Has a modeling protocol been submitted to and approved by the Air Quality Division?	No
Has the Air Quality Division received a Q/D analysis to submit to the respective FLMs to determine the need for an AQRV analysis?	No

Required Attachments:

Facility Map	☑
Process Flow Diagram	☑
Modeling Analysis (if applicable)	☑
Land Use Planning Document	☐
Detailed Project Description	☑
Emissions Calculations	☑

I, Charles Cornell (Responsible Official (Printed Name)) Sr. Regulatory Lead (Title)

an Official Representative of the Company, state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I further certify that the operational information provided and emission rates listed on this application reflect the anticipated emissions due to the operation of this facility. The facility will operate in compliance with all applicable Wyoming Air Quality Standards and Regulations.

Signature: (ink) Date: 8/19/2015

Specific Emission Unit Attributes:

Engine

Company Equipment ID: E1
Company Equipment Description: Natural gas-fired compressor engine #1 (Unit 5885)

Operating Status: Not Yet Installed
Initial Construction Commencement Date: TBD
Initial Operation Commencement Date: TBD
Most Recent Construction/ Modification Commencement Date: TBD

Most Recent Operation Commencement Date: TBD

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Construction (Greenfield/New Facility)

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:

Name Plate Rating: 1050 Units: hp
Site Rating: 1029 Units: hp
Primary Fuel Type: Field Gas
Secondary Fuel Type:
Model Name and Number: G3516 TA
Engine Type: 4 Stroke Rich Burn
Serial Number Tracking Table:
Serial Number: WPS00181 Order Date: August 2015
Manufacturer Name: Caterpillar
Construction/Installation Commencement Date: TBD
Operation Commencement/ Start-up Date: TBD
Manufacture Date: 7/28/2008
Btu Content: 1119 Units: BTU/scf
Fuel Sulfur Content: Negligible Units:
Type of Service: Compression
Is diesel engine EPA Tier Certified? * If yes, list EPA Tier Rating

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

20200253

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24
Hours/year: 8760

Control Equipment: Yes

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Subject to subpart

New Source Performance Standard are listed under 40 CFR 60-Standards of Performance for New Stationary Sources.

NSPS Subpart: *Subpart JJJJ*

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Subject, but exempt

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: Subpart ZZZZ - New at Area Source

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Not Affected

These rules are found under WAQSR Chapter 6, Section 13.

Specific Emission Unit Attributes:

Engine

Company Equipment ID: E2
Company Equipment Description: Natural gas-fired compressor engine #2 (Unit 5100)

Operating Status: Not Yet Installed
Initial Construction Commencement Date: TBD
Initial Operation Commencement Date: TBD
Most Recent Construction/ Modification Commencement Date: TBD

Most Recent Operation Commencement Date: TBD

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Construction (Greenfield/New Facility)

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:

Name Plate Rating: 1340 Units: hp
Site Rating: 1340 Units: hp
Primary Fuel Type: Field Gas
Secondary Fuel Type:
Model Name and Number: G3516 TALE
Engine Type: 4 Stroke Lean Burn
Serial Number Tracking Table:
Serial Number: WPW02221 Order Date: August 2015
Manufacturer Name: Caterpillar
Construction/Installation Commencement Date: TBD
Operation Commencement/ Start-up Date: TBD
Manufacture Date: 5/16/2008
Btu Content: 1119 Units: BTU/scf
Fuel Sulfur Content: Negligible Units:
Type of Service: Compression
Is diesel engine EPA Tier Certified? * If yes, list EPA Tier Rating

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

20200254

Potential Operating Schedule: Provide the operating schedule for this emission unit.
Hours/day: 24
Hours/year: 8760

Control Equipment: Yes

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Subject to subpart

New Source Performance Standard are listed under 40 CFR 60-Standards of Performance for New Stationary Sources.

NSPS Subpart: *Subpart JJJJ*

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Subject, but exempt

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: Subpart ZZZZ - New at Area Source

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Not Affected

These rules are found under WAQSR Chapter 6, Section 13.

Specific Emission Unit Attributes:

Heater/Chiller

Company Equipment ID: H1
Company Equipment Description: Indirect Heater #1 - 1.0 MMBtu/hr unit

Operating Status: Not Yet Installed
Initial Construction Commencement Date: TBD
Initial Operation Commencement Date: TBD
Most Recent Construction/ Modification Commencement Date: TBD

Most Recent Operation Commencement Date: TBD

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Construction (Greenfield/New Facility)

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:

Firing Type: Indirect
Heat Input Rating: 1.0 Units: MMBtu/hr
Primary Fuel Type: Field Gas
Secondary Fuel Type:
Heat Content of Fuel: 1119 Units: BTU/scf
Fuel Sulfur Content: Negligible Units:

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

31000404

Potential Operating Schedule: Provide the operating schedule for this emission unit.
Hours/day: 24
Hours/year: 8760

Control Equipment: No

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Not Affected

New Source Performance Standard are listed under 40 CFR 60- Standards of Performance for New Stationary Sources.

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Not Affected

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Not Affected

These rules are found under WAQSR Chapter 6, Section 13.

Specific Emission Unit Attributes:

Heater/Chiller

Company Equipment ID: H2
Company Equipment Description: Indirect Heater #2 - 1.0 MMBtu/hr unit

Operating Status: Not Yet Installed
Initial Construction Commencement Date: TBD
Initial Operation Commencement Date: TBD
Most Recent Construction/ Modification Commencement Date: TBD

Most Recent Operation Commencement Date: TBD

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Construction (Greenfield/New Facility)

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:

Firing Type: Indirect
Heat Input Rating: 1.0 Units: MMBtu/hr
Primary Fuel Type: Field Gas
Secondary Fuel Type:
Heat Content of Fuel: 1119 Units: BTU/scf
Fuel Sulfur Content: Negligible Units:

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

31000404

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24
Hours/year: 8760

Control Equipment: No

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Not Affected

New Source Performance Standard are listed under 40 CFR 60-Standards of Performance for New Stationary Sources.

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Not Affected

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Not Affected

These rules are found under WAQSR Chapter 6, Section 13.

Pollutant Emissions Form
(submit one for each emission unit)

Emissions Information- The following tables request information needed to determine the applicable requirements and the compliance status of this emission unit with those requirements.

			Efficiency Standards				
		Pre-Controlled Potential Emissions (tons/yr)	Potential to Emit (PTE)	Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
Criteria Pollutants:							
1.)	Particulate emissions (PE/PM) (formerly particulate matter, PM)				0.32	1.4	AP-42
2.)	PM #10 microns in diameter (PE/PM10)				0.32	1.4	AP-42
3.)	PM #2.5 microns in diameter (PE/PM2.5)				0.32	1.4	AP-42
4.)	Sulfur dioxide (SO2)				0.27	1.2	Other
5.)	Nitrogen Oxides (NOx)				2.79	12.2	Other
6.)	Carbon monoxide (CO)				6.51	28.5	Other
7.)	Volatile organic compounds (VOC)				3.22	14.1	Other
8.)	Lead (Pb)				Neg	Neg	
9.)	Total Hazardous Air Pollutants (HAPs)				0.64	2.82	AP-42
10.)	Fluoride (F)						
11.)	Hydrogen Sulfide (H2S)						
12.)	Mercury (Hg)						
13.)	Total Reduced Sulfur (TRS)						
14.)	Sulfuric Acid Mist (SAM)						

**Provide your calculations as an attachment and explain how all process variables and emissions factors were selected.*

Revised 6/30/2015

Pollutant Emissions Form
(submit one for each emission unit)

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminents

Pollutants:		Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)	Formaldehyde				0.32	1.42	
2.)	Methanol				0.05	0.22	
3.)	Acetaldehyde				0.12	0.54	
4.)	Acrolein				0.08	0.35	
5.)							
6.)							
7.)							
8.)							

Greenhouse Gases (GHGs)

Pollutants:		Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)							
2.)							
3.)							
4.)							
5.)							
6.)							
7.)							
8.)							

Release Point Information:

Complete the table below for ***each*** release point. Please include release point information for each emission unit. Multiple attachments may be necessary. A release point is a point at which emissions from an emission unit are released into the ambient (outside)air. List each individual release point on a separate pair of lines (release point ID and description). ***For longitude and latitude, use NAD 83/WGS84 datum and 5 digits after the decimal (i.e. 41.12345, -107.56789)***

Stack Release Point Information		
Company Release Point ID:	Release Point Type:	Vertical
E1	Release Point Easting:	604003.1
	Release Point Northing:	4701465.7
Company Release Point Description:	Base Elevation (ft):	7126
Natural gas-fired compressor engine #1 (Unit 5885) - Rich-burn unit	Stack Height (ft):	26.25
	Stack Diameter (ft):	0.833
	Exit Gas Velocity (ft/s):	94.35
	Exit Gas Temp (F):	912
	Exit Gas Flow Rate (acfm):	3087.6
Company Release Point ID:	Release Point Type:	Vertical
E2	Release Point Easting:	604017.6
	Release Point Northing:	4701479.0
Company Release Point Description:	Base Elevation (ft):	7126
Natural gas-fired compressor engine #2 (Unit 5100) - Lean-burn unit	Stack Height (ft):	26.25
	Stack Diameter (ft):	1.00
	Exit Gas Velocity (ft/s):	202.78
	Exit Gas Temp (F):	983
	Exit Gas Flow Rate (acfm):	9556
Company Release Point ID:	Release Point Type:	Vertical
H1	Release Point Easting:	604002.2
	Release Point Northing:	4701506.1
Company Release Point Description:	Base Elevation (ft):	7126
Indirect heater #1	Stack Height (ft):	12
	Stack Diameter (ft):	0.5
	Exit Gas Velocity (ft/s):	54.89
	Exit Gas Temp (F):	601
	Exit Gas Flow Rate (acfm):	646.7
Company Release Point ID:	Release Point Type:	Vertical
H2	Release Point Easting:	604008.5
	Release Point Northing:	4701498.9
Company Release Point Description:	Base Elevation (ft):	7126
Indirect heater #2	Stack Height (ft):	12
	Stack Diameter (ft):	0.5
	Exit Gas Velocity (ft/s):	54.89
	Exit Gas Temp (F):	601
	Exit Gas Flow Rate (acfm):	646.7

Release Point Form

Complete the table below for each fugitive (area, volume, line) release point. List each individual release point on a separate line.

Fugitive Release Point Information	
Company Release Point ID:	Release Point Latitude:
	Release Point Longitude:
	Release Height (ft):
Company Release Point Description:	
Company Release Point ID:	Release Point Latitude:
	Release Point Longitude:
	Release Height (ft):
Company Release Point Description:	
Company Release Point ID:	Release Point Latitude:
	Release Point Longitude:
	Release Height (ft):
Company Release Point Description:	
Company Release Point ID:	Release Point Latitude:
	Release Point Longitude:
	Release Height (ft):
Company Release Point Description:	

Control Equipment:

Catalytic NOx Control Technology

Manufacturer: DCL International, Inc.
Date Installed: TBD
Model Name and Number: TBD
Company Control Equipment ID: CE1
Company Control Equipment Description: NSCR Catalyst

Pollutant(s) Controlled: ☑ CO ☑ NOx ☐ Pb ☐ SO2 ☑ VOC ☐ PM ☐ PM (FIL) ☐ PM Condensible ☐ PM 10 (FIL) ☐ PM 2.5 (FIL) ☐ PM 10 ☐ PM 2.5 ☐ Other

NOTE: The following fields require numeric values unless otherwise denoted with an asterisk*

Design Control Efficiency (%):
Capture Efficiency (%):
Operating Control Efficiency (%):
Catalytic Reduction Type:* Nonselective Catalytic
Reagent Type:
Reagent Injection Rate- specify units:
Reagent Slip Concentration (ppbv):
Reagent Slip Concentration % O2:
Inlet Gas Flow Rate (acfm):
Inlet Gas Temp (F):
Outlet Gas Temp (F):
Air Fuel Ratio Controller:* Yes

☑ This is the only control equipment on this air contaminant source

If not, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List all other emission units that are also vented to this control equipment:* N/A

List all release point IDs associated with this control equipment:* E1 (Unit 5885)

Control Equipment:

Oxidation Catalyst

Manufacturer: DCL International, Inc.
Date Installed: TBD
Model Name and Number: TBD
Company Control Equipment ID: CE2
Company Control Equipment Description:

Pollutant(s) Controlled:

☑ CO	☐ NOx	☐ Pb	☐ SO2	☑ VOC	☐ PM	
☐ PM (FIL)	☐ PM Condensible	☐ PM 10 (FIL)	☐ PM 2.5 (FIL)	☐ PM 10	☐ PM 2.5	
☐ Other						

NOTE: The following fields require numeric values unless otherwise denoted with an asterisk*

Design Control Efficiency (%): Capture Efficiency (%):
Operating Control Efficiency (%):
Catalyst Type:* Oxidation Catalyst **Air Fuel Ratio Controller:*** Yes

☑ This is the only control equipment on this air contaminant source

If not, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List all other emission units that are also vented to this control equipment:* N/A

List all release point IDs associated with this control equipment:* E2 (Unit 5100)

JONAH ENERGY LLC

Reviewer AmB
cc:
Modeler
D.E.
File A0000944
IMP FID 13347

April 29, 2015

Air Quality NSR Program
Wyoming Department of Environmental Quality
Air Quality Division
Herschler Building, 2-E
122 West 25th Street
Cheyenne, WY 82002

RE: Jonah Energy LLC
Request for C6 S2 Air Permit Application
Compressor Engine To Be Located at SHB 1-29 Production Facility
Sublette County, Wyoming

SCANNED

Dear WDEQ:

Jonah Energy LLC is submitting this letter along with the attached air permit forms and associated emissions to the Wyoming Department of Environmental Quality (WDEQ) Air Quality Division (AQD) to request the installation and operation of one (1) compressor engine associated with a line pressure reduction project in the Jonah field of operations. This application is being submitted following the in-person meeting between Jonah Energy LLC and the WDEQ-AQD that occurred on September 26, 2014 with Mr. Cole Anderson, Mr. Andrew Keyfauver and Mr. Josh Nall, and on April 6, 2015 with Mr. Todd Parfait and Mr. Steve Dietrich, along with subsequent phone conversations with the WDEQ-AQD.

Jonah Energy is requesting that the WDEQ issue a C6 S2 air permit for the permanent installation of one (1) compressor engine as part of a line pressure reduction project to determine if a decrease in line pressure will result in an increase in production along with a decrease in emissions in the Jonah field. If successful, the decrease in emissions would be a result of the reduced line pressure minimizing tank flash emissions within the Jonah field. The line pressure reduction project would consist of installing a horizontal separator, up to two (2) low pressure separators and associated heaters and a compressor engine for a maximum of 8760 hours of operation.

Currently, the one (1) compressor engine and associated separator heaters that would be installed at the Stud Horse Butte (SHB) 1-29 production facility have not yet been ordered; therefore, engine-specific information is not yet available at this time. The compressor engine that would be installed at the SHB 1-29 production facility would either be a natural gas-fired four-stroke lean-burn (4SLB) engine or a natural gas-fired four-stroke rich-burn (4SRB) engine with a maximum nameplate horsepower (HP) of 1850 HP. The two (2) separator heaters associated with the line pressure reduction project each have a maximum rating of 1.0 MMBtu/hr heat input. Jonah Energy is requesting to operate the compressor engine and separator heaters up to 8760 hours per year.

Since the compressor engine that would be installed at the SHB 1-29 production facility would likely be a rental unit, Jonah Energy would like to make note to the WDEQ-AQD that under current circumstances the make/model of engine to be installed will be directly related to the particular engine that is available by the specified rental company at the time the engine is procured. Since Jonah Energy has not chosen a specified engine vendor, Jonah Energy would like to request the flexibility of installing a range of make/model engines. Whichever compressor engine is eventually chosen to be installed at the SHB 1-29 production facility, it would continue to remain less than the maximum nameplate horsepower that would be permitted under this application.

The associated WDEQ-AQD permit application forms, emission calculations and supporting documentation are included with the permit application submittal.

Chapter 6, Section 2(c)(ii) Offset Demonstration

In a letter dated July 21, 2008, the WDEQ issued an interim policy on demonstration of compliance with Wyoming Air Quality Standards and Regulations Chapter 6, Section 2(c)(ii) for sources in Sublette County. This interim policy requires air permit applications for new or modified emission sources of NO_X and/or VOC to be accompanied by a demonstration that the proposed facility will not prevent the attainment or maintenance of an ambient air quality standard. One option for such demonstration includes emission reductions for NO_X and/or VOC emissions. Emissions reductions that may be used as offsets include activities that result in NO_X and/or VOC emissions reductions within Sublette County, such as projects that result in a change of operation that occur after April 1, 2008.

An analysis of the NO_X and VOC emissions and offsets, if necessary, for the SHB 1-29 compressor engine are identified in **Table 1**.

Table 1
Offset Emissions Analysis – SHB 1-29 Compressor Engine

Facility Emissions	NO_X (tpy)	VOC (tpy)
Emissions Resulting After Compressor Engine and Separator Heater Installation	9.8	12.6
Proposed Emissions Increase/(Decrease) From Proposed Modification	**9.8**	**12.6**
Offset Ratio	***1.1:1***	***1.5:1***
Emissions Required to be Offset	**10.8**	**18.9**

As the emissions resulting from the project will result in a minimal increase of NO_X and VOC, it can be presumed that the compressor engine addition to the SHB 1-29 facility will not cause further impairment to ambient air quality due to the overall reduction of Jonah Energy's emissions from other permitting actions. Jonah Energy requests that the WDEQ offset the NO_X and VOC emissions from the compressor engine installation from Jonah Energy's offset bank. Jonah Energy understands that they have enough NO_X and VOC emission credits available to offset the emissions identified in **Table 1**. We understand that this project will satisfy the WDEQ's Chapter 6, Section 2(c)(ii) interim permitting policy for sources in Sublette County.

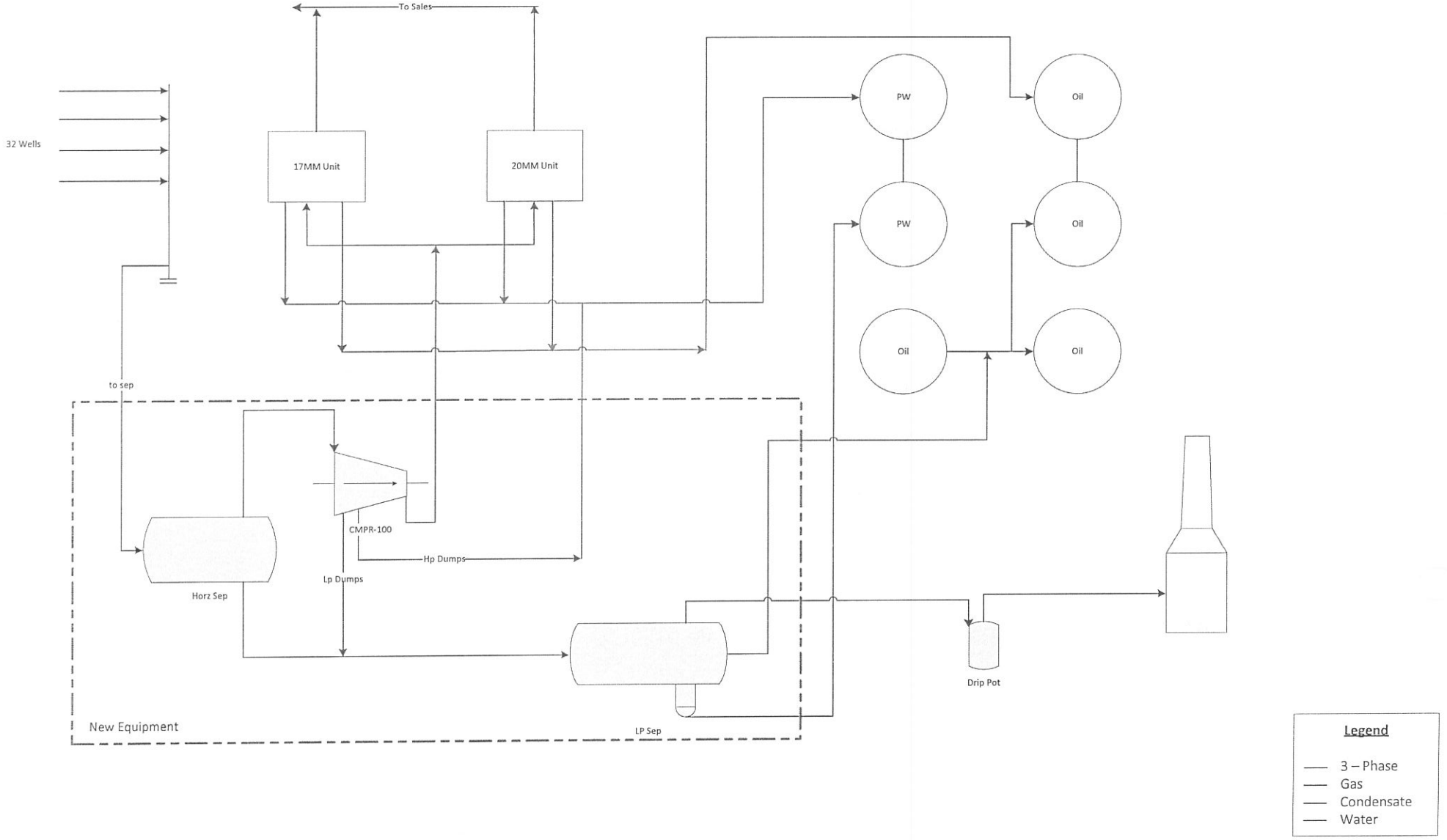
WDEQ permit application forms are included as **Attachment A**, supporting emission calculations are included as **Attachment B**, and a current copy of Jonah Energy's offset bank spreadsheet is included as **Attachment C**. One original signed copy is enclosed, along with a CD that includes the electronic copies of the application forms and associated emissions calculations for the SHB 1-29 compressor engine as part of the line pressure reduction project.

If you have any questions in regards to this application submittal, please contact me at 720.577.1251 or via email at chuck.cornell@jonahenergy.com.

Sincerely,

Charles Cornell
Sr. Regulatory Lead

Compressor Pilot PFD



ATTACHMENT A

WYOMING PERMIT APPLICATION FORMS

Revised 1/22/2015

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

Air Quality Division

New Source Review Permit Application Form

Is this an addendum to an existing application?

Yes _____ No X Date of Application: 4/29/2015

Previous Application #: _____

COMPANY INFORMATION:

Company Name: Jonah Energy LLC
Address: 707 17th Street, Suite 2700
City: Denver State: Colorado Zip Code: 80202
Country: USA Phone Number: 720.577.1000

FACILITY INFORMATION:

Facility Name: SHB 1-29 Compressor Engine
New Facility or Existing Facility: New
Facility Description: Compressor Engine - Line Pressure Reduction Project
Facility Class: Minor Operating Status: Not Yet Installed
Facility Type: Production Site

For Oil & Gas Production Sites ONLY:
First Date of Production (FDOP)/Date of Modification: N/A
Does production at this facility contain H2S?* No
If yes, contact the Division.
API Number(s): _____

NAICS Code: 211111 Crude Petroleum and Natural Gas Extraction

FACILITY LOCATION:

**Enter the facility location in either the latitude/longitude area or section/township/range area. Both are not required.*
Physical Address: _____
City: _____
State: WY County: _____

OR

Latitude: 42.45861 Longitude: -109.734722 County: Sublette
Quarter Quarter: NE Quarter: NE
Section: 29 Township: 29N Range: 108W
For longitude and latitude, use NAD 83/WGS84 datum and 5 digits after the decimal (i.e. 41.12345, -107.56789)

CONTACT INFORMATION:

*Note that an Environmental AND NSR Permitting Contact is required for your application to be deemed complete by the agency.
Title: Mr. First Name: Charles
Last Name: Cornell
Company Name: Jonah Energy LLC
Job Title: Sr. Regulatory Lead
Address: 707 17th Street, Suite 2700
City: Denver State: Colorado
Zip Code: 80202
Primary Phone No.: 720.577.1251 E-mail: chuck.cornell@jonahenergy.com
Mobile Phone No.: 970.988.6067 Fax No.: _____
Contact Type: Environmental contact Start Date: October 6, 2014

Additional Contact Type (if needed): NSR Permitting contact
Title: First Name:
Last Name:
Company Name:
Job Title:
Address:
City: State:
Zip Code:
Primary Phone No.: E-mail:
Mobile Phone No.: Fax No.:
Contact Type: Start Date:

FACILITY APPLICATION INFORMATION:

General Info:

Has the facility changed location or is it a new/ greenfield facility?	No
Has a Land Use Planning document been included in this application?	No
Is the facility located in a sage grouse core area?*	No
If the facility is in a sage grouse core area, what is the WER number?	

** For questions about sage grouse core area, contact WY Game & Fish Department.*

Federal Rules Applicability - Facility Level:

Prevention of Significant Deterioration (PSD):	No
Non-Attainment New Source Review:	No

Modeling Section:

Has the Air Quality Division been contacted to determine if modeling is required?	Yes
Is a modeling analysis part of this application?	No
Is the proposed project subject to Prevention of Significant Deterioration (PSD) requirements?	No
Has the Air Quality Division been notified to schedule a pre-application meeting?	No
Has a modeling protocol been submitted to and approved by the Air Quality Division?	No
Has the Air Quality Division received a Q/D analysis to submit to the respective FLMs to determine the need for an AQRV analysis?	No

Required Attachments:

Facility Map	☑
Process Flow Diagram	☑
Modeling Analysis (if applicable)	☐
Land Use Planning Document	☐
Detailed Project Description	☑
Emissions Calculations	☑

I, Charles Cornell (Responsible Official (Printed Name)) Sr. Regulatory Lead (Title)

an Official Representative of the Company, state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I further certify that the operational information provided and emission rates listed on this application reflect the anticipated emissions due to the operation of this facility. The facility will operate in compliance with all applicable Wyoming Air Quality Standards and Regulations.

Signature: (ink) Date: 4/29/2015

Revised 1/22/2015

Specific Emission Unit Attributes:

Engine

Company Equipment ID: E1
Company Equipment Description: Natural gas-fired compressor engine

Operating Status: Not Yet Installed
Initial Construction Commencement Date: TBD
Initial Operation Commencement Date: TBD
Most Recent Construction/ Modification Commencement Date: TBD

Most Recent Operation Commencement Date: TBD

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Construction (Greenfield/New Facility)

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:

Name Plate Rating: 1850 Units: hp
Site Rating: <1850 Units: hp
Primary Fuel Type: Field Gas
Secondary Fuel Type:
Model Name and Number: TBD
Engine Type: 4 Stroke Rich Burn
Serial Number Tracking Table:
Serial Number: TBD Order Date: TBD
Manufacturer Name: TBD
Construction/Installation Commencement Date: TBD
Operation Commencement/ Start-up Date: TBD
Manufacture Date: TBD
Btu Content: 1120 Units:
Fuel Sulfur Content: Neg Units:
Type of Service: Compression
Is diesel engine EPA Tier Certified? * If yes, list EPA Tier Rating

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

Potential Operating Schedule: Provide the operating schedule for this emission unit.
Hours/day: 24
Hours/year: 8760

Control Equipment: ☐

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Subject to subpart

New Source Performance Standard are listed under 40 CFR 60-Standards of Performance for New Stationary Sources.

NSPS Subpart: Potentially NSPS JJJJ, depending on manufacture date

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Subject to subpart

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: Potentially MACT ZZZZ, depending on manufacture date

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Not Affected

These rules are found under WAQSR Chapter 6, Section 13.

Revised 1/22/2015

Specific Emission Unit Attributes:

Engine

Company Equipment ID: E1
Company Equipment Description: Natural gas-fired compressor engine

Operating Status: Not Yet Installed
Initial Construction Commencement Date: TBD
Initial Operation Commencement Date: TBD
Most Recent Construction/ Modification Commencement Date: TBD

Most Recent Operation Commencement Date: TBD

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Construction (Greenfield/New Facility)

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:

Name Plate Rating: 1850 Units: hp
Site Rating: <1850 Units: hp
Primary Fuel Type: Field Gas
Secondary Fuel Type:
Model Name and Number: TBD
Engine Type: 4 Stroke Lean Burn
Serial Number Tracking Table:
Serial Number: TBD Order Date: TBD
Manufacturer Name: TBD
Construction/Installation Commencement Date: TBD
Operation Commencement/ Start-up Date: TBD
Manufacture Date: TBD
Btu Content: 1120 Units:
Fuel Sulfur Content: Neg Units:
Type of Service: Compression
Is diesel engine EPA Tier Certified? * If yes, list EPA Tier Rating

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24
Hours/year: 8760

Control Equipment: ☐

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Subject to subpart

New Source Performance Standard are listed under 40 CFR 60-Standards of Performance for New Stationary Sources.

NSPS Subpart: Potentially NSPS JJJJ, depending on manufacture date

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Subject to subpart

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: Potentially MACT ZZZZ, depending on manufacture date

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Not Affected

These rules are found under WAQSR Chapter 6, Section 13.

Revised 1/22/2015

Specific Emission Unit Attributes:

Heater/Chiller

Company Equipment ID: H1

Company Equipment Description: Indirect Heater #1 - 1.0 MMBtu/hr unit

Operating Status: Not yet installed

Initial Construction Commencement Date: TBD

Initial Operation Commencement Date: TBD

Most Recent Construction/ Modification Commencement Date: TBD

Most Recent Operation Commencement Date: TBD

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Construction (Greenfield/New Facility)

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:

Firing Type: Indirect

Heat Input Rating: 1.0 Units: MMBtu/hr

Primary Fuel Type: Field Gas

Secondary Fuel Type:

Heat Content of Fuel: 1120 Units: BTU/scf

Fuel Sulfur Content: Neg Units:

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

2310021100

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24

Hours/year: 8760

Control Equipment: No

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Not Affected

New Source Performance Standard are listed under 40 CFR 60- Standards of Performance for New Stationary Sources.

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Not Affected

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Not Affected

These rules are found under WAQSR Chapter 6, Section 13.

Revised 1/22/2015

Specific Emission Unit Attributes:

Heater/Chiller

Company Equipment ID: H2

Company Equipment Description: Indirect Heater #2 - 1.0 MMBtu/hr unit

Operating Status: Not yet installed

Initial Construction Commencement Date: TBD

Initial Operation Commencement Date: TBD

Most Recent Construction/ Modification Commencement Date: TBD

Most Recent Operation Commencement Date: TBD

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Construction (Greenfield/New Facility)

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:

Firing Type: Indirect

Heat Input Rating: 1.0 Units: MMBtu/hr

Primary Fuel Type: Field Gas

Secondary Fuel Type:

Heat Content of Fuel: 1120 Units: BTU/scf

Fuel Sulfur Content: Neg Units:

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

2310021100

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24

Hours/year: 8760

Control Equipment: No

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Not Affected

New Source Performance Standard are listed under 40 CFR 60- Standards of Performance for New Stationary Sources.

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Not Affected

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Not Affected

These rules are found under WAQSR Chapter 6, Section 13.

Emissions Information- The following tables request information needed to determine the applicable requirements and the compliance status of this emission unit with those requirements.

			Efficiency Standards				
		Pre-Controlled Potential Emissions (tons/year)	Potential to Emit (PTE)	Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/year)	Basis for Determination
Criteria Pollutants:							
1.)	Particulate emissions (PE/PM) (formerly particulate matter, PM)				0.38	1.67	AP-42
2.)	PM #10 microns in diameter (PE/PM10)				0.38	1.67	AP-42
3.)	PM #2.5 microns in diameter (PE/PM2.5)				0.38	1.67	AP-42
4.)	Sulfur dioxide (SO2)				0.27	1.16	Other
5.)	Nitrogen Oxides (NOx)				2.24	9.79	Other
6.)	Carbon monoxide (CO)				6.28	27.52	Other
7.)	Volatile organic compounds (VOC)				2.87	12.55	Other
8.)	Lead (Pb)				Neg	Neg	
9.)	Total Hazardous Air Pollutants (HAPs)				0.36	2.85	AP-42
10.)	Fluoride (F)				N/A	N/A	
11.)	Hydrogen Sulfide (H2S)				N/A	N/A	
12.)	Mercury (Hg)				N/A	N/A	
13.)	Total Reduced Sulfur (TRS)				N/A	N/A	
14.)	Sulfuric Acid Mist (SAM)				N/A	N/A	

**Provide your calculations as an attachment and explain how all process variables and emissions factors were selected.*

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminents

Pollutants:		Pre-Controlled Potential Emissions (tons/year)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/year)	Basis for Determination
1.)	Formaldehyde				0.29	1.25	
2.)	Acetaldehyde				0.16	0.69	
3.)	Acrolein				0.1	0.42	
4.)							
5.)							
6.)							

Greenhouse Gases (GHGs)

Pollutants:		Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)							
2.)							
3.)							
4.)							
5.)							
6.)							

Revised 1/22/2015

Control Equipment:

Oxidation Catalyst

Manufacturer: TBD
Date Installed: TBD
Model Name and Number: TBD
Company Control Equipment ID:
Company Control Equipment Description: Oxidation catalyst with AFRC

Pollutant(s) Controlled:

☑ CO	☐ NOx	☐ Pb	☐ SO2	☑ VOC	☐ PM				
☐ PM (FIL)	☐ PM Condensible	☐ PM 10 (FIL)	☐ PM 2.5 (FIL)	☐ PM 10	☐ PM 2.5				
☐ Other									

NOTE: The following fields require numeric values unless otherwise denoted with an asterisk*

Design Control Efficiency (%): Capture Efficiency (%):
Operating Control Efficiency (%):
Catalyst Type:* Oxidation Catalyst **Air Fuel Ratio Controller:*** Yes

☑ This is the only control equipment on this air contaminant source

If not, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List all other emission units that are also vented to this control equipment:* N/A

List all release point IDs associated with this control equipment:* E1

Revised 1/22/2015

Control Equipment:

Catalytic NOx Control Technology

Manufacturer: TBD
Date Installed: TBD
Model Name and Number: TBD
Company Control Equipment ID: E1-control
Company Control Equipment Description: NSCR with AFRC

Pollutant(s) Controlled:	☑ CO	☑ NOx	☐ Pb	☐ SO2	☑ VOC	☐ PM
☐ PM (FIL)	☐ PM Condensible	☐ PM 10 (FIL)	☐ PM 2.5 (FIL)	☐ PM 10	☐ PM 2.5	
☐ Other						

NOTE: The following fields require numeric values unless otherwise denoted with an asterisk*

Design Control Efficiency (%): Capture Efficiency (%):
Operating Control Efficiency (%):
Catalytic Reduction Type:* Nonselective Catalytic
Reagent Type:
Reagent Injection Rate- specify units:
Reagent Slip Concentration (ppbv):
Reagent Slip Concentration % O2:
Inlet Gas Flow Rate (acfm):
Inlet Gas Temp (F): Outlet Gas Temp (F):
Air Fuel Ratio Controller:* Yes

☑ This is the only control equipment on this air contaminant source

If not, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List all other emission units that are also vented to this control equipment:* N/A

List all release point IDs associated with this control equipment:* E1

Revised 1/22/2015

Release Point Information:

Complete the table below for ***each*** release point. Please include release point information for each emission unit. Multiple attachments may be necessary. A release point is a point at which emissions from an emission unit are released into the ambient (outside)air. List each individual release point on a separate pair of lines (release point ID and description). ***For longitude and latitude, use NAD 83/WGS84 datum and 5 digits after the decimal (i.e. 41.12345, -107.56789)***

Stack Release Point Information

Company Release Point ID:	Release Point Type:	Vertical
E1-stack	Release Point Latitude:	42.45861
	Release Point Longitude:	-109.734722
Company Release Point Description:	Base Elevation (ft):	7101
Compressor engine exhaust stack	Stack Height (ft):	1.5X bldg height
	Stack Diameter (ft):	TBD
	Exit Gas Velocity (ft/s):	#VALUE!
	Exit Gas Temp (F):	>500
	Exit Gas Flow Rate (acfm):	TBD

Company Release Point ID:	Release Point Type:	
	Release Point Latitude:	
	Release Point Longitude:	
Company Release Point Description:	Base Elevation (ft):	
	Stack Height (ft):	
	Stack Diameter (ft):	
	Exit Gas Velocity (ft/s):	
	Exit Gas Temp (F):	
	Exit Gas Flow Rate (acfm):	

Company Release Point ID:	Release Point Type:	
	Release Point Latitude:	
	Release Point Longitude:	
Company Release Point Description:	Base Elevation (ft):	
	Stack Height (ft):	
	Stack Diameter (ft):	
	Exit Gas Velocity (ft/s):	
	Exit Gas Temp (F):	
	Exit Gas Flow Rate (acfm):	

Company Release Point ID:	Release Point Type:	
	Release Point Latitude:	
	Release Point Longitude:	
Company Release Point Description:	Base Elevation (ft):	
	Stack Height (ft):	
	Stack Diameter (ft):	
	Exit Gas Velocity (ft/s):	
	Exit Gas Temp (F):	
	Exit Gas Flow Rate (acfm):	

Revised 1/22/2015

Complete the table below for each fugitive (area, volume, line) release point. List each individual release point on a separate line.

Fugitive Release Point Information	
Company Release Point ID:	Release Point Latitude:
	Release Point Longitude:
Company Release Point Description:	Release Height (ft):
Company Release Point ID:	Release Point Latitude:
	Release Point Longitude:
Company Release Point Description:	Release Height (ft):
Company Release Point ID:	Release Point Latitude:
	Release Point Longitude:
Company Release Point Description:	Release Height (ft):
Company Release Point ID:	Release Point Latitude:
	Release Point Longitude:
Company Release Point Description:	Release Height (ft):

ATTACHMENT B

SUPPORTING EMISSION CALCULATIONS

Summary of Critiera Pollutant Emissions
Jonah Energy LLC
SHB 1-29 Compressor Engine

Unit ID	Source	NOx		CO		VOC		SO2		PM10 / PM2.5	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
E1	Natural gas-fired Lean-Burn Compressor Engine, 1850 HP	2.04	8.93	4.08	17.86	2.85	12.50	0.24	1.05	0.19	0.82
E1	Natural gas-fired Rich-Burn Compressor Engine, 1850 HP	2.04	8.93	6.12	26.80	2.85	12.50	0.24	1.05	0.37	1.60
H1	Natural gas-fired separator heater #1, 1.0 MMBtu/hr	0.10	0.43	0.08	0.36	0.005	0.02	0.01	0.06	0.007	0.03
H2	Natural gas-fired separator heater #2, 1.0 MMBtu/hr	0.10	0.43	0.08	0.36	0.005	0.02	0.01	0.06	0.007	0.03
	Totals - With Lean-Burn Engine	**2.24**	**9.79**	**4.24**	**18.59**	**2.87**	**12.55**	**0.27**	**1.16**	**0.20**	**0.89**
	Totals - With Rich-Burn Engine	**2.24**	**9.79**	**6.28**	**27.52**	**2.87**	**12.55**	**0.27**	**1.16**	**0.38**	**1.67**

Notes:
(1) Engine and heater emissions are based upon a maximum of 8760 operating hours

CALCULATIONS AND COMPUTATIONS

Emission Source:	Compressor Engine	
Source Type:	Natural Gas-Fired RICE - Rich Burn	
Site-Rated Horsepower (HP)	1850	Max Permitted Horsepower
Maximum Fuel Usage (Btu/bhp-hr)	10182	Manf Spec Sheet, HHV
Number of Units:	1	
Natural Gas Heating Value (BTU/scf)	1120	Analysis Data
Sulfur Content of Fuel (grains/scf):	0.05	Estimated
Operating Hours per Year:	**8760**	

One (1) Compressor Engine

Compound	Emission Factor (a)	Emission Rate	
		Hourly (b) (Lbs/Hr)	Annual (c) (Tons/Year)
NOx	0.5	2.04	8.93
CO	1.5	6.12	26.80
VOC	0.7	2.85	12.50
HCHO	0.05	0.20	0.89
SO2	0.013	0.24	1.05
PM-10 - total	0.02	0.37	1.60

Notes:

(a) Emission factors for NOx, CO, VOC and HCHO (g/hp-hr) based upon proposed WDEQ BACT limits
Emission factor for SO2 (lb/MMBtu) based maximum estimated sulfur content of natural gas of 5 grains/100 scf
PM10 emission factor (lb/MMBtu) from USEPA AP-42, Chapter 3.2, Table 3.2-3 (4SRB), dated July 2000.
PM10 emission factor includes PM10 filterable and PM condensable

(b) Hourly Emission Rate (Lbs/Hr) = (Emission Factor, g/hp-hr) * (Horsepower, HP) / 453.6
Hourly Emission Rate (Lbs/Hr) = (Emission Factor, lb/MMBtu) * (Horsepower, HP) * (Fuel Consumption, Btu/bhp-hr) / 1,000,000

(c) Annual Emission Rate (Tons/Yr) = (Hourly Emission Rate, Lbs/Hr) * (Hour of Operation Per Year, Hr/Yr) / (2,000 Lbs/Ton)

CALCULATIONS AND COMPUTATIONS

Emission Source:	Compressor Engine	
Source Type:	Natural Gas-Fired RICE - Lean Burn	
Site-Rated Horsepower (HP)	1850	Max Permitted Horsepower
Maximum Fuel Usage (Btu/bhp-hr)	10182	Manf Spec Sheet, HHV
Number of Units:	1	
Natural Gas Heating Value (BTU/scf)	1120	Analysis Data
Sulfur Content of Fuel (grains/scf):	0.05	Estimated
Operating Hours per Year:	**8760**	

One (1) Compressor Engine

Compound	Emission Factor (a)	Emission Rate	
		Hourly (b) (Lbs/Hr)	Annual (c) (Tons/Year)
NOx	0.5	2.04	8.93
CO	1.0	4.08	17.86
VOC	0.7	2.85	12.50
HCHO	0.07	0.29	1.25
SO2	0.013	0.24	1.05
PM-10 - total	0.01	0.19	0.82

Notes:

(a) Emission factors for NOx, CO, VOC and HCHO (g/hp-hr) based upon proposed WDEQ BACT limits
Emission factor for SO2 (lb/MMBtu) based maximum estimated sulfur content of natural gas of 5 grains/100 scf
PM10 emission factor (lb/MMBtu) from USEPA AP-42, Chapter 3.2, Table 3.2-2 (4SLB), dated July 2000.
PM10 emission factor includes PM10 filterable and PM condensable

(b) Hourly Emission Rate (Lbs/Hr) = (Emission Factor, g/hp-hr) * (Horsepower, HP) / 453.6
Hourly Emission Rate (Lbs/Hr) = (Emission Factor, lb/MMBtu) * (Horsepower, HP) * (Fuel Consumption, Btu/bhp-hr) / 1,000,000

(c) Annual Emission Rate (Tons/Yr) = (Hourly Emission Rate, Lbs/Hr) * (Hour of Operation Per Year, Hr/Yr) / (2,000 Lbs/Ton)

CALCULATIONS AND COMPUTATIONS

Emission Source:	Separator Heaters	
Source Type:	Natural Gas-Fired Heaters	
Heat Input (mmBtu/hr):	1.00	Permitted heat input
Number of Units:	2	
Natural Gas Consumption (MMscf/yr)	7.8	calculated; one heater
Natural Gas Consumption (MMscf/yr)	15.6	calculated; 2 heaters
Natural Gas Heating Value (BTU/scf)	1120	Analysis Data
Sulfur Content of Fuel (grains/scf):	0.05	Estimated
Operating Hours per Year:	**8760**	

One Separator Heater

Compound	Emission Factor (a)	Emission Rate	
		Hourly (b) (Lbs/Hr)	Annual (c) (Tons/Year)
NOx	100	0.10	0.43
CO	84	0.08	0.36
VOC	5.5	0.005	0.02
SO2	1.27E-02	0.01	0.06
PM-10	7.60	0.007	0.03

Two Separator Heaters

Compound	Emission Factor (a)	Emission Rate	
		Hourly (b) (Lbs/Hr)	Annual (c) (Tons/Year)
NOx	100	0.20	0.86
CO	84	0.16	0.72
VOC	5.5	0.01	0.05
SO2	1.27E-02	0.03	0.11
PM-10	7.60	0.01	0.07

Notes:

(a) Emission factors (lb/MMscf) based on USEPA AP-42, Chapter 1.4, Tables 1.4-1 and 1.4-2, dated July 1998, except for SO2 Emission factor for SO2 (lb/MMBtu) based assumed sulfur content of natural gas

(b) Hourly Emission Rate (Lbs/Hr) except for SO2 = (Emission Factor, lb/MMscf) * (Heat Input, MMBtu/hr) * (Actual Natural Gas Heating Value, Btu/scf) / (AP-42 Natural Gas Heating Value, Btu/scf) / (AP-42 Natural Gas Heating Value, Btu/scf)

(b) Hourly Emission Rate (Lbs/Hr) for SO2 = (Emission Factor, Lb/MMBtu) * (Heat Input, MMBtu/hr)

(c) Annual Emission Rate (Tons/Yr) = (Hourly Emission Rate, Lbs/Hr) * (Hour of Operation Per Year, Hr/Yr) / (2,000 Lbs/Ton)

Calculations and Computations

Pollutant	Type[a]	Emission Factor AP-42 Section 3.2, 7/00 - Natural Gas-Fired Reciprocating Engines - Rich Burn (g/bhp-hr)	(lb/MMBtu)[d]	Rating	Natural Gas Combustion: Maximum Heat Input, one engine (MMBtu/Hr)[b]	Average Heat Input, one engine (MMBtu/Hr)[c]	Natural Gas-Fired Compressor Engine Emissions: Emission Rate, One Engine Hourly[e] (lb/hr)	Annual (lbs/yr)	Annual[f] (tpy)	Emission Rate, One Engines Hourly[e] (lb/hr)	Annual[f] (tpy)	Major (Y/N)
1,1,2,2-Tetrachloroethane	HAP		2.53E-05	C	18.84	18.84	4.77E-04	4.2	2.09E-03	4.77E-04	2.09E-03	No
1,1,2-Trichloroethane	HAP		1.53E-05	E	18.84	18.84	2.88E-04	2.5	1.26E-03	2.88E-04	1.26E-03	No
1.3-Butadiene	HAP		6.63E-04	D	18.84	18.84	1.25E-02	109.4	5.47E-02	1.25E-02	5.47E-02	No
1,3-Dichloropropene	HAP		1.27E-05	E	18.84	18.84	2.39E-04	2.1	1.05E-03	2.39E-04	1.05E-03	No
Acetaldehyde	HAP		2.79E-03	C	18.84	18.84	5.26E-02	460.4	2.30E-01	5.26E-02	2.30E-01	No
Acrolein	HAP		2.63E-03	C	18.84	18.84	4.95E-02	434.0	2.17E-01	4.95E-02	2.17E-01	No
Benzene	HAP		1.58E-03	C	18.84	18.84	2.98E-02	260.7	1.30E-01	2.98E-02	1.30E-01	No
Carbon Tetrachloride	HAP		1.77E-05	E	18.84	18.84	3.33E-04	2.9	1.46E-03	3.33E-04	1.46E-03	No
Chlorobenzene	HAP		1.29E-05	E	18.84	18.84	2.43E-04	2.1	1.06E-03	2.43E-04	1.06E-03	No
Chloroform	HAP		1.37E-05	E	18.84	18.84	2.58E-04	2.3	1.13E-03	2.58E-04	1.13E-03	No
Ethylbenzene	HAP		2.48E-05	E	18.84	18.84	4.67E-04	4.1	2.05E-03	4.67E-04	2.05E-03	No
Ethylene Dibromide	HAP		2.13E-05	E	18.84	18.84	4.01E-04	3.5	1.76E-03	4.01E-04	1.76E-03	No
Formaldehyde	HAP	0.05			18.84	18.84	2.04E-01	1786.4	8.93E-01	2.04E-01	8.93E-01	No
Methanol	HAP		3.06E-03	D	18.84	18.84	5.76E-02	504.9	2.52E-01	5.76E-02	2.52E-01	No
Methylene Chloride	HAP		4.12E-05	C	18.84	18.84	7.76E-04	6.8	3.40E-03	7.76E-04	3.40E-03	No
Naphthalene	HAP		9.71E-05	E	18.84	18.84	1.83E-03	16.0	8.01E-03	1.83E-03	8.01E-03	No
PAH	HAP		1.41E-04	D	18.84	18.84	2.66E-03	23.3	1.16E-02	2.66E-03	1.16E-02	No
Styrene	HAP		1.19E-05	E	18.84	18.84	2.24E-04	2.0	9.82E-04	2.24E-04	9.82E-04	No
Toluene	HAP		5.58E-04	A	18.84	18.84	1.05E-02	92.1	4.60E-02	1.05E-02	4.60E-02	No
Vinyl Chloride	HAP		7.18E-06	E	18.84	18.84	1.35E-04	1.2	5.92E-04	1.35E-04	5.92E-04	No
Xylene	HAP		1.95E-04	A	18.84	18.84	3.67E-03	32.2	1.61E-02	3.67E-03	1.61E-02	No
							0.43	3753.0				

Hours of Operation	8,760 hours/yr			
Number of Engines	1			
Horsepower	1,850 HP			
Fuel Consumption	10,182 Btu/bhp-hr	Compressor Engine Total HAPs	1.88	1.88 No
Heat Input	18.84 MMBtu/hr			
		Maximum Individual HAP	0.89	0.89 No
NSCR Control Efficiency =	0.0% Assume 0% for calcs			

Notes:
(a) Type = HAP for Hazardous Air Pollutant.
(b) Maximum heat input rate for the temporary compressor engine is based on calculated heat input rate of 18.84 MMBtu/hr
(c) Assume average heat input rate is the same as maximum heat input rate.
(d) Emission factors from AP-42, Section 3.2, Tables 3.2-3 for 4SRB engines except formaldehyde. Formaldehyde factor based on WDEQ BACT
(e) Hourly Emission Rate (lb/hr) = [Heat Input Rate (MMBtu/Hr) * Emission Factor (lb/MMBtu)]
(f) Annual Emission Rate (tpy) = (Average Hourly Emission Rate, lb/hr) * (8760 hr/yr) / (2,000 lb/ton)

Calculations and Computations

Pollutant	Type[a]	Emission Factor AP-42 Section 3.2, 7/00 - Natural Gas-Fired Reciprocating Engines - Lean Burn (g/bhp-hr)	(lb/MMBtu)[d]	Rating	Natural Gas Combustion: Maximum Heat Input, one engine (MMBtu/Hr)[b]	Average Heat Input, one engine (MMBtu/Hr)[c]	Natural Gas-Fired Compressor Engine Emissions: Emission Rate, One Engine Hourly[e] (lb/hr)	Annual (lbs/yr)	Annual[f] (tpy)	Emission Rate, One Engines Hourly[e] (lb/hr)	Annual[f] (tpy)	Major (Y/N)
1,1,2,2-Tetrachloroethane	HAP		4.00E-05	E	18.84	18.84	7.53E-04	6.6	3.30E-03	7.53E-04	3.30E-03	No
1,1,2-Trichloroethane	HAP		3.18E-05	E	18.84	18.84	5.99E-04	5.2	2.62E-03	5.99E-04	2.62E-03	No
1.3-Butadiene	HAP		2.67E-04	D	18.84	18.84	5.03E-03	44.1	2.20E-02	5.03E-03	2.20E-02	No
1,3-Dichloropropene	HAP		2.64E-05	E	18.84	18.84	4.97E-04	4.4	2.18E-03	4.97E-04	2.18E-03	No
2-Methylnaphthalene	HAP		3.32E-05	C	18.84	18.84	6.25E-04	5.5	2.74E-03	6.25E-04	2.74E-03	No
2,2,4-Trimethylpentane	HAP		2.50E-04	C	18.84	18.84	4.71E-03	41.3	2.06E-02	4.71E-03	2.06E-02	No
Acenaphthene	HAP		1.25E-06	C	18.84	18.84	2.35E-05	0.2	1.03E-04	2.35E-05	1.03E-04	No
Acenaphthylene	HAP		5.53E-06	C	18.84	18.84	1.04E-04	0.9	4.56E-04	1.04E-04	4.56E-04	No
Acetaldehyde	HAP		8.36E-03	A	18.84	18.84	1.57E-01	1379.5	6.90E-01	1.57E-01	6.90E-01	No
Acrolein	HAP		5.14E-03	A	18.84	18.84	9.68E-02	848.1	4.24E-01	9.68E-02	4.24E-01	No
Benzene	HAP		4.40E-04	A	18.84	18.84	8.29E-03	72.6	3.63E-02	8.29E-03	3.63E-02	No
Benzo(b)fluoranthene	HAP		1.66E-07	D	18.84	18.84	3.13E-06	0.0	1.37E-05	3.13E-06	1.37E-05	No
Benzo(e)pyrene	HAP		4.15E-07	D	18.84	18.84	7.82E-06	0.1	3.42E-05	7.82E-06	3.42E-05	No
Benzo(g,h,i)perylene	HAP		4.14E-07	D	18.84	18.84	7.80E-06	0.1	3.42E-05	7.80E-06	3.42E-05	No
Biphenyl	HAP		2.12E-04	D	18.84	18.84	3.99E-03	35.0	1.75E-02	3.99E-03	1.75E-02	No
Carbon Tetrachloride	HAP		3.67E-05	E	18.84	18.84	6.91E-04	6.1	3.03E-03	6.91E-04	3.03E-03	No
Chlorobenzene	HAP		3.04E-05	E	18.84	18.84	5.73E-04	5.0	2.51E-03	5.73E-04	2.51E-03	No
Chloroform	HAP		2.85E-05	E	18.84	18.84	5.37E-04	4.7	2.35E-03	5.37E-04	2.35E-03	No
Chrysene	HAP		6.93E-07	C	18.84	18.84	1.31E-05	0.1	5.72E-05	1.31E-05	5.72E-05	No
Ethylbenzene	HAP		3.97E-05	B	18.84	18.84	7.48E-04	6.6	3.28E-03	7.48E-04	3.28E-03	No
Ethylene Dibromide	HAP		4.43E-05	E	18.84	18.84	8.34E-04	7.3	3.65E-03	8.34E-04	3.65E-03	No
Fluoranthene	HAP		1.11E-06	C	18.84	18.84	2.09E-05	0.2	9.16E-05	2.09E-05	9.16E-05	No
Fluorene	HAP		5.67E-06	C	18.84	18.84	1.07E-04	0.9	4.68E-04	1.07E-04	4.68E-04	No
Formaldehyde	HAP	0.07			18.84	18.84	2.85E-01	2500.9	1.25E+00	2.85E-01	1.25E+00	No
Methanol	HAP		2.50E-03	B	18.84	18.84	4.71E-02	412.5	2.06E-01	4.71E-02	2.06E-01	No
Methylene Chloride	HAP		2.00E-05	C	18.84	18.84	3.77E-04	3.3	1.65E-03	3.77E-04	1.65E-03	No
n-Hexane	HAP		1.11E-03	C	18.84	18.84	2.09E-02	183.2	9.16E-02	2.09E-02	9.16E-02	No
Naphthalene	HAP		7.44E-05	C	18.84	18.84	1.40E-03	12.3	6.14E-03	1.40E-03	6.14E-03	No
PAH	HAP		2.69E-05	D	18.84	18.84	5.07E-04	4.4	2.22E-03	5.07E-04	2.22E-03	No
Phenanthrene	HAP		1.04E-05	D	18.84	18.84	1.96E-04	1.7	8.58E-04	1.96E-04	8.58E-04	No
Pyrene	HAP		1.36E-06	C	18.84	18.84	2.56E-05	0.2	1.12E-04	2.56E-05	1.12E-04	No
Styrene	HAP		2.36E-05	E	18.84	18.84	4.45E-04	3.9	1.95E-03	4.45E-04	1.95E-03	No
Tetrachloroethane	HAP		2.48E-06	D	18.84	18.84	4.67E-05	0.4	2.05E-04	4.67E-05	2.05E-04	No
Toluene	HAP		4.08E-04	B	18.84	18.84	7.69E-03	67.3	3.37E-02	7.69E-03	3.37E-02	No
Vinyl Chloride	HAP		1.49E-05	C	18.84	18.84	2.81E-04	2.5	1.23E-03	2.81E-04	1.23E-03	No
Xylene	HAP		1.84E-04	B	18.84	18.84	3.47E-03	30.4	1.52E-02	3.47E-03	1.52E-02	No
							0.65	5697.4				
Hours of Operation		8,760 hours/yr										
Number of Engines		1										
Horsepower		1,850 HP										
Fuel Consumption		10,182 Btu/bhp-hr					Compressor Engine Total HAPs		2.85		2.85	No
Heat Input		18.84 MMBtu/hr										
							Maximum Individual HAP		1.25		1.25	No
NSCR Control Efficiency =		0.0% Assume 0% for calcs										

Notes:
(a) Type = HAP for Hazardous Air Pollutant.
(b) Maximum heat input rate for the temporary compressor engine is based on calculated heat input rate of 18.84 MMBtu/hr
(c) Assume average heat input rate is the same as maximum heat input rate.
(d) Emission factors from AP-42, Section 3.2, Tables 3.2-2 for 4SLB engines except formaldehyde. Formaldehyde factor based on WDEQ BACT
(e) Hourly Emission Rate (lb/hr) = [Heat Input Rate (MMBtu/Hr) * Emission Factor (lb/MMBtu)]
(f) Annual Emission Rate (tpy) = (Average Hourly Emission Rate, lb/hr) * (8760 hr/yr) / (2,000 lb/ton)

ATTACHMENT C

JONAH ENERGY OFFSET BANK SPREADSHEET

SUBLETTE COUNTY PERMITTED EMISSIONS April 1, 2008 - PRESENT

Date of Public Notice	Application Date	Application Number	Company	Facility	PermitNumber	PermitDate	CurrentVOC	CurrentNOx	Base Emissions April 1, 2008 Emissions VOC	Base Emissions April 1, 2008 Emissions NO_x	Base Emissions Previous Permit VOC	Base Emissions Previous Permit NO_x	Delta VOC	Delta NOx	Offset VOC	Offset NOx	Trade VOC for NOx	Comments
	9/16/2008	7855	EnCana	Stud Horse Butte 10-20 CF	MD-7855		23.3	4.6	77.4	2.5	0	0	-54.1	2.1	-54.1	2.1	no	this permit is already issued so no NOx offsets are required
4/17/2008	3/14/2008	7519	EnCana	SAG 34-19	CT-7519	4/1/2009	12.8	0.9	10.6	0.6	0	0	2.2	0.3	2.2	0.3	yes	
1/8/2009	2/13/2008 & 8/13/2008	8200	EnCana	Stud Horse Butte 13-26 CF	MD-8200	4/1/2009	31.8	7.6	16.3	4.1	0	0	15.5	3.5	24.1	3.9	yes	
6/26/2008	5/7/2008	7761	EnCana	Stud Horse Butte 6-28 CF	MD-7761	4/1/2009	14.2	2.2	6.4	1.3	0	0	7.8	0.9	7.8	0.9	yes	
6/12/2008	4/22/2008	7692	EnCana	Stud Horse Butte 7-15 CF	MD-7692	4/1/2009	10.3	3.8	8.5	2.3	0	0	9.8	1.5	9.8	1.5	yes	
9/22/2008	6/17/2008	7905	EnCana	Jonah Workforce Facility	MD-7905	4/22/2009	14.3	11.5	9.2	13			5.1	-1.5	5.1	-1.5		Annual emissions reduction due to employee vehicle traffic of 13.0 tpy NO_x, 60.0 tpy CO, 9.2 tpy VOC, and 196.1 tpy PM
1/8/2009	6/25/2008	7975	EnCana	Corona - SHB 15-19 CF	MD-7975	4/1/2009	29.3	6.5	81.7	1.7	0	0	-52.4	4.8	-52.4	4.8	yes	addition of 3 existing wells that had no dehy/tank controls and 1 well with no dehy controls
1/8/2009	5/16/2008	7807	EnCana	Stud Horse Butte 32-10	CT-7807	4/1/2009	5.1	1	4.9	1	0	0	0.2	0	0.2	0	no	
1/8/2009	5/21/2008 & 8/5/2008	8176	EnCana	Jonah Federal 11-1H CF	CT-8176	4/1/2009	11.3	2.3	5.3	1.5	0	0	6.0	0.8	9.0	0.9	yes	
1/8/2009	6/18/2008	7924	EnCana	Jonah Federal 1-5 CF	MD-7924	4/1/2009	13.8	3.9	25.4	2.8	0	0	-11.6	1.1	-11.6	1.1	yes	controlling pneumatic pumps
1/8/2009	6/25/2008	7972	EnCana	Jonah Federal 5-4 CF	MD-7972	4/1/2009	28.2	6.3	19.5	2.5	0	0	8.7	3.8	8.7	3.8	yes	
1/8/2009	6/25/2008	7973	EnCana	SOL 9-36	CT-7973	4/1/2009	4.7	1.2	0	0	0	0	4.7	1.2	4.7	1.2	yes	
1/8/2009	6/25/2008	7974	EnCana	Stud Horse Butte 12-36 CF	MD-7974	4/1/2009	20.1	6.1	90.4	3.7	0	0	-62.3	2.4	-62.3	2.5	yes	consolidating wells and controlling previously uncontrolled tanks and dehydration units
1/8/2009	12/5/2007	7003	EnCana	Stud Horse Butte 71-32 CF	MD-7003	4/1/2009	13	3.4	12.3	3.3	0	0	0.7	0.1	0.7	0.1	yes	
1/8/2009	12/27/2007	7162	EnCana	Stud Horse Butte 48-16	CT-7162	4/1/2009	11	0.6	11	0.6	0	0	0	0	0	0	yes	would have a decrease in VOC if pneumatic pumps were controlled (modified prior to 9/1/07 so control is not required)
	12/5/2007	7056	EnCana	Stud Horse Butte 16-26 CF	MD-7056	4/1/2009	16.7	1.6	15.7	1.5	0	0	1.0	0.1	1.0	0.1	yes	would have a decrease in VOC if pneumatic pumps were control (modified prior to 9/1/07 so control is not required)
1/8/2009	12/13/2007 & 8/13/2008	8199	EnCana	Yellow Point 8-13 CF	MD-8199	4/1/2009	18.4	3.4	9.2	1.4	0	0	9.2	2	13.8	2.2	yes	
1/8/2009	7/10/2008	8035	EnCana	Corona - SHB 10-31 CF	MD-8035	4/1/2009	29.3	6.8	89.8	4.2	0	0	-60.5	2.6	-60.5	2.6	yes	addition of 3 existing wells that had no dehy or tank controls
8/28/2008	7/29/2008	8095	EnCana	Yellow Point 4-12 CF	MD-8095	9/30/2008	31.9	4.4	219	15.7	0	0	-187.1	-11.3	-187.1	-11.3		consolidation of 29 wells which decreases the number of dehydration units / tanks now controlled at 2 of the existing wells / pneumatic pumps now controlled
1/8/2009	7/23/2008	8104	EnCana	Stud Horse Butte 4-27 CF	MD-8104	4/1/2009	22.6	4.5	34.7	1.5	0	0	-12.1	3	-12.1	3	yes	adding well to CF that has no dehy controls
1/8/2009	7/28/2008	8109	EnCana	Corona 3-31 CF	MD-8109	4/1/2009	20.1	3.6	20.9	1	0	0	-0.8	2.6	-0.8	2.6	yes	
1/8/2009	7/28/2008	8110	EnCana	Stud Horse Butte 11-26 CF	MD-8110	4/1/2009	35.1	8.8	18.2	2.1	0	0	16.9	6.7	16.9	6.7	yes	
1/8/2009	8/15/2008	8202	EnCana	Stud Horse Butte 11-17 CF	MD-8202	4/1/2009	30.5	6.1	57.1	1.7	0	0	-26.6	4.4	-26.6	4.8	yes	decrease due to consolidation of previously uncontrolled equipment
	9/18/2008	8132	EnCana	Section 32 Methanol Tank	wv-8132	9/18/2008	0.3	0	0	0	0	0	0.3	0	0.3	0		
1/8/2009	9/4/2008	8326	EnCana	Jonah Federal 1-6 CF	MD-8326	4/1/2009	22.7	5.2	45.6	3.4	0	0	-22.9	1.8	-22.9	2	yes	decrease due to consolidation of previously uncontrolled equipment
1/8/2009	9/15/2008	8357	EnCana	Yellow Point 2-1 CF	MD-8357	4/1/2009	23	4.9	25	2.5	0	0	-2	2.4	-2	2.6	yes	controlling pneumatic pumps
1/8/2009	9/15/2008	8358	EnCana	Stud Horse Butte 10-33 CF	MD-8358	4/1/2009	10.1	4.4	22.3	5.4	0	0	-4.2	-1	-4.2	-1		controlling pneumatic pumps / less heaters
1/8/2009	10/15/2008	8409	EnCana	SOL 2-2 CF	CT-8409	4/1/2009	4.3	0.9	0	0	0	0	4.3	0.9	6.5	1	yes	
NA	8/13/2008	7164	EnCana	Yellow Point 1-13 CF	MD-7164	7/1/2008	22.4	4.5	11.6	2.5	0	0	10.8	2	16.2	2.2	yes	short form application
NA	8/13/2008	7438	EnCana	Stud Horse Butte 16-34R CF	MD-7438	5/2/2008	19.4	4	7.7	1.5	0	0	11.7	2.5	17.8	2.8	yes	short form application
NA	8/13/2008	6758	EnCana	Stud Horse Butte 4-26 CF	MD-6758	5/2/2008	36.1	8.2	22	2.6	0	0	14.1	5.6	21.2	6.2	yes	short form application
NA	9/25/2008	7855	EnCana	Stud Horse Butte 7-26 CF	MD-7855	5/20/2008	38.1	8.6	14	3.4	0	0	24.1	5.2	36.2	5.7	yes	short form application
1/8/2009	10/2/2008	8440	EnCana	Corona-SHB 10-30 CF	MD-8440	4/1/2009	27.3	8.3	77.5	2.6	0	0	-50.2	5.7	-50.2	6.3	yes	consolidating wells and controlling previously uncontrolled tanks and dehydration units
1/8/2009	10/2/2008	8441	EnCana	Stud Horse Butte 11-36 CF	MD-8441	4/1/2009	18.5	4.1	62.5	1.6	0	0	-44	2.5	-44.0	2.8	yes	consolidating wells and controlling previously uncontrolled tanks and dehydration units
1/8/2009	10/7/2008	8458	EnCana	Jonah Federal 1-8 CF	MD-8458	4/1/2009	14.4	2.9	23.9	0.3	0	0	-9.5	2.6	-9.5	2.9	yes	controlling previously uncontrolled well
1/8/2009	10/8/2008	8467	EnCana	Stud Horse Butte 7-36 CF	MD-8467	4/1/2009	15.7	2.9	43.8	0.9	0	0	-28.1	2	-28.1	2.2	yes	consolidating wells and controlling previously uncontrolled tanks and dehydration units
1/8/2009	10/15/2008	8490	EnCana	Stud Horse Butte 11-20 CF	MD-8490	4/1/2009	35.6	8.9	144.4	7.1	0	0	-108.8	1.8	-108.8	2.0	yes	consolidating wells and controlling previously uncontrolled tanks and dehydration units
1/8/2009	10/16/2008	8498	EnCana	Stud Horse Butte 16-18 CF	MD-8498	4/1/2009	9.4	2.6	20	0.4	0	0	-10.6	2.2	-10.6	2.4	yes	controlling previously uncontrolled dehy/tank emissions
1/8/2009	10/28/2008	8566	EnCana	Stud Horse Butte 122-10 CF	MD-8566	4/1/2009	10.2	3.7	16.4	0.4	0	0	1.8	3.3	2.7	3.6	yes	
1/8/2009	11/12/2008	8620	EnCana	Yellow Point 16-13 CF	CT-8620	4/1/2009	11.6	2.8	0	0	0	0	11.6	2.8	17.4	3.1	yes	
NA	4/1/2008	7561	EnCana	Jonah Office Building	wv-7561	10/27/2008	1.5	1	0	0	0.4	1.1	1.1	-0.1	1.1	-0.1	no	new facility, relinquishing authority to operate engines authorized under waivers AP-4396 and AP-4397
NA	3/10/2009	4633A	EnCana	Section 36 Water Disposal	CT-4633A	3/30/2009	1.1	2.7	0.0	0.0	1.1	2.7	0.0	0.0	0.0	0.0	no	Engine Swap
NA						4/1/2009									76.9	-76.9		Recognize offset trading VOC for Nox
NA	2/28/2009	9858	EnCana	Stud Horse Butte 13-26 CF	MD-8200	4/29/2009	31.8	7.6	0.0	0.0	31.8	7.6	0.0	0.0	0.0	0.0	NA	short form application no change in emisson from AP-8200
NA	3/4/2009	9894	EnCana	Corona-SHB 10-31 CF	MD-8035	10/26/2009	33.5	7.1	0.0	0.0	29.3	6.8	4.2	0.3	6.3	0.3	NA	Short Form
N/A	3/19/2009	9181	EnCana	Corona Stud Horse Butte 10-30	MD-8440	4/30/2009	27.3	8.3	0.0	0.0	27.3	8.3	0.0	0.0	0.0	0.0	NA	short form application no change in emisson from AP-8440
NA	4/1/2009	9257	EnCana	SOL 9-36	CT-7973	10/26/2009	7.8	2.0	0.0	0.0	4.7	1.2	3.1	0.8	4.7	0.9	NA	Short Form
	5/22/2009	9450	EnCana	Stud Horse Butte 3-27 CF	MD-7696	10/26/2009	24.9	4.8	104.5	2.8	0	0	-79.6	2.8	-79.6	3.1	NA	
NA	7/1/2009	9655	EnCana	Stud Horse Butte 11-17 CF	MD-8202	10/26/2009	30.5	6.2	0.0	0.0	30.5	6.1	0.0	0.1	0.0	0.1	NA	Short Form
NA	7/30/2009	9730	EnCana	Stud Horse Butte 15-19 CF	MD-7975	8/24/2009	11.0	2.6	0.0	0.0	29.3	6.5	-18.3	-3.9	-18.3	-3.9	NA	Permitting Actual Production Instead of PTE- Short Form
NA	8/10/2009	9772	EnCana	Yellow Point 1-13 CF	MD-7164	8/24/2009	8.4	2.2	0.0	0.0	22.4	4.5	-14.0	-2.3	-14.0	-2.3	NA	Short Form Application- Permitting at Actual production Instr PTE
NA	8/20/2009	9800	EnCana	Stud Horse Butte 4-26 CF	MD-6758	10/26/2009	27.5	8.9	0.0	0.0	36.1	8.2	-8.6	0.7	-8.6	0.8	NA	Short Form Application- Permitting at Actual Instead of PTE
9/25/2009	9/17/2009	8122	EnCana	Drill Rig Fleet	CT-8122	1/1/2010	79.0	202.0	97.1	457.1	0	0	-18.1	-175.1	-18.1	-175.1	NA	Drill Rig Fleet
10/2/2009	11/17/2008	8649	EnCana	Holmes State 1-36	CT-8649	1/19/2010	2.2	0.5	0.0	0.0	0.0	0.0	2.2	0.5	3.3	0.6	NA	
10/2/2009	11/26/2008	8691	EnCana	Cabrito 7-30 CF	MD-8691	1/19/2010	18.3	3.9	19.0	1.5	0.0	0.0	-0.7	2.4	-0.7	2.6	NA	Controlling Pneumatic pumps that did not require controls as of April 1, 2008
10/2/2009	11/26/2008	8692	EnCana	Yellow Point 1-12 CF	MD-8692	1/19/2010	14.8	3.9	50.4	4.9	0.0	0.0	-35.6	-1.0	-35.6	-1.0	NA	consolidating wells and controlling previously uncontrolled dehydration units and pneumatics
1/8/2009	11/21/2008	8673	EnCana	Stud Horse Butte 16-26 CF	MD-7056	10/26/2009	14.8	2.9	16.7	1.6	0.0	0.0	-1.9	1.3	-1.9	1.4	NA	
10/2/2009	11/21/2008	8672	EnCana	Crimson State 12-36	CT-8672	1/19/2010	2.6	0.5	0.0	0.0	0.0	0.0	2.6	0.5	3.9	0.6	NA	
10/2/2009	12/1/2008	8704	EnCana	Jonah Federal 5-6 CF	MD-8704	1/19/2010	14.2	2.9	14.2	1.5	0.0	0.0	0.0	1.4	0.0	1.5	NA	
10/2/2009	12/3/2008	8709	EnCana	Stud Horse Butte 3-34 CF	MD-8709	1/19/2010	14.3	4.2	43.5	1.4	0.0	0.0	-29.2	2.8	-29.2	3.1	NA	consolidating wells and controlling previously uncontrolled tanks and dehydration units
10/2/2009	12/10/2008	8749	EnCana	Crimson State 16-2	CT-8749	1/19/2010	3.0	0.5	0.0	0.0	0.0	0.0	3.0	0.5	4.5	0.6	NA	
10/2/2009	12/10/2008	8750	EnCana	Yellow Point 1-34 CF	CT-8750	1/19/2010	2.9	0.5	0.0	0.0	0.0	0.0	2.9	0.5	4.4	0.6	NA	
10/2/2009	12/9/2008	8744	EnCana	Cabrito 13-30 CF	MD-8744	1/19/2010	43.2	8.6	77.5	2.0	0.0	0.0	-34.3	6.6	-34.3	7.3	NA	consolidating wells and controlling previously uncontrolled tanks and dehydration units
10/2/2009	1/29/2009	8748	EnCana	Crimson Federal 16-14	CT-8748	1/19/2010	5.3	0.8	0.0	0.0	0.0	0.0	5.3	0.8	8.0	0.9	NA	
10/9/2009	2/20/2009	7348	EnCana	Stud Horse Butte 11-22 CF	MD-7348	1/13/2010	31.9	6.8	12.6	3.4	0.0	0.0	19.3	3.4	19.3	3.4	NA	
10/9/2009	12/11/2008	8760	EnCana	Stud Horse Butte 3-36 CF	MD-8760	1/13/2010	20.6	4.1	64.1	3.2	0.0	0.0	-43.5	0.9	-43.5	1.0	NA	consolidating wells and controlling previously uncontrolled tanks and dehydration units
10/9/2009	12/15/2008	8766	EnCana	Stud Horse Butte 11-34 CF	MD-8766	1/13/2010	17.0	3.7	60.5	2.3	0.0	0.0	-42.7	1.4	-42.7	1.5	NA	consolidating wells and controlling previously uncontrolled tanks and dehydration units
10/9/2009	12/11/2008	8758	EnCana	Hacienda 6-17A	CT-8758	1/13/2010	4.4	0.7	0.0	0.0	0.0	0.0	4.4	0.7	6.6	0.8	NA	
10/9/2009	12/11/2008	8759	EnCana	Stud Horse Butte 2-36 CF	MD-8759	1/13/2010	22.7	4.1	20.3	2.2	0.0	0.0	2.4	1.9	3.6	2.1	NA	

10/9/2009	12/15/2008	8767	EnCana	Stud Horse Butte 1-36 CF	MD-8767	1/13/2010	24.7	4.5	43.2	1.9	0.0	0.0	-18.5	2.6	-18.5	2.8	NA	consolidating wells and controlling previously uncontrolled dehydration units and pneumatics
10/9/2009	12/18/2008	8820	EnCana	Stud Horse Butte 8-14 CF	MD-8820	1/13/2010	19.3	3.7	16.7	0.4	0.0	0.0	2.6	3.3	3.9	3.6	NA	
10/9/2009	12/17/2008	8776	EnCana	Stud Horse Butte 12-29 CF	MD-8776	1/13/2010	23.1	4.4	92.3	1.6	0.0	0.0	-69.2	2.8	-69.2	3.1	NA	consolidating wells and controling previously uncontrolled dehydration units and pneumatics
10/9/2009	1/15/2009	8881	EnCana	Stud Horse Butte 04-9 CF	MD-8881	1/13/2010	20.1	4.0	34.8	0.8	0.0	0.0	-14.7	3.2	-14.7	3.5	NA	consolidating wells and controlling previously uncontrolled dehydration units and pneumatics
10/9/2009	1/20/2009	8912	EnCana	Stud Horse Butte 1-29 CF	MD-8912	1/13/2010	23.0	4.3	213.0	4.8	0.0	0.0	-190.0	-0.5	-190.0	-0.5	NA	consolidating wells and controlling previously uncontrolled dehydration units and pneumatics
10/16/2009	1/26/2009	8923	EnCana	Crimson Federal 15-24	MD-8923	1/13/2010	4.6	0.6	0.0	0.0	0.0	0.0	4.6	0.6	6.9	0.7	NA	
10/16/2009	1/27/2009	8922	EnCana	Yellow Point 10-13 CF	MD-8922	1/13/2010	20.4	3.5	87.6	3.4	0.0	0.0	-67.2	0.1	-67.2	0.1	NA	consolidating wells and controlling previously uncontrolled dehydration units and pneumatics
10/16/2009	1/29/2009	8919	EnCana	Hacienda 6-19 CF	MD-8919	1/13/2010	5.7	1.1	17.3	0.4	0.0	0.0	-11.6	0.7	-11.6	0.8	NA	consolidating wells and controlling previously uncontrolled dehydration units and pneumatics
10/16/2009	2/10/2009	9065	EnCana	Crimson Federal 10-36	MD-9065	1/13/2010	3.9	0.6	0.0	0.0	0.0	0.0	3.9	0.6	5.9	0.7	NA	
10/16/2009	2/20/2009	9059	EnCana	Stud Horse Butte 48-22 CF	MD-9059	1/13/2010	20.7	4.2	0.0	0.0	0	0	20.7	4.2	31.1	4.6	NA	
10/16/2009	2/26/2009	9070	EnCana	Crimson Unit 2-18	MD-9070	1/13/2010	4.4	0.6	0.0	0.0	0	0	4.4	0.6	6.6	0.7	NA	
10/16/2009	3/12/2009	9149	EnCana	Stud Horse Butte 124-11 CF	MD-9149	1/13/2010	16.1	3.0	17.9	0.1	0	0	-1.8	3.7	-1.8	4.1	NA	controlling previously uncontrolled tanks and dehydration units
10/16/2009	3/24/2009	9208	EnCana	Crimson Federal 7-35	CT-9208	1/13/2010	0.8	0.5	0.0	0.0	0	0	0.8	0.5	1.2	0.6	NA	
10/16/2009	3/27/2009	9216	EnCana	Stud Horse Butte 1-34 CF	MD-9216	1/13/2010	9.9	2.3	11.4	1.6	0	0	-1.5	0.7	-1.5	0.8	NA	consolidating wells and controlling previously uncontrolled dehydration units and pneumatics
10/16/2009	4/1/2009	9253	EnCana	Stud Horse Butte 1-27 CF	MD-9253	1/13/2010	19.1	5.0	61.5	9.6	0	0	-42.4	-4.6	-42.4	-4.6	NA	consolidating wells and controlling previously uncontrolled dehydration units and pneumatics
10/23/2009	4/14/2009	9282	EnCana	Cabrito 2-31 CF	MD-9289	1/14/2010	8.6	1.9	10.7	1.0	0	0	-2.1	0.9	-2.1	1.0	NA	
10/23/2009	4/13/2009	9283	EnCana	Crimson Unit 8-31	CT-9283	1/14/2010	0.8	0.5	0.0	0.0	0	0	0.8	0.5	1.2	0.6	NA	
10/23/2009	4/27/2009	9354	EnCana	Hacienda 5-20	CT-9354	1/14/2010	2.6	0.8	0.0	0.0	0	0	2.6	0.8	3.9	0.9	NA	
10/23/2009	4/30/2009	9351	EnCana	Stud Horse Butte 16-20/9-28	MD-9351	1/14/2010	7.3	2.2	36.4	1.8	0	0	-29.1	0.4	-29.1	0.4	NA	consolidating wells and controlling previously uncontrolled dehydration units, pneumatics, and tanks
NA	5/7/2009	9306	EnCana	Stud Horse Butte 12-15 CF	MD-7782	10/26/2009	27.4	6.9	0.0	0.0	22.7	2.5	4.7	4.4	7.3	4.8	NA	
10/23/2009	5/22/2009	9455	EnCana	Stud Horse Butte 2-28 CF	MD-9455	1/14/2010	18.9	4.6	14.0	2.6	0	0	4.9	2.0	7.4	2.2	NA	
10/23/2009	5/22/2009	9456	EnCana	Stud Horse Butte 15-28 CF	MD-9456	1/14/2010	18.7	4.7	5.8	3.3	0	0	12.9	1.4	19.4	1.5	NA	
10/23/2009	5/22/2009	9451	EnCana	Hacienda 12-21	CT-9451	1/14/2010	1.7	0.7	0.0	0.0	0	0	1.7	0.7	2.6	0.8	NA	
10/23/2009	5/27/2009	9476	EnCana	Yellow Point 10-14 CF	MD-9476	1/14/2010	12.6	3.3	7.5	3.1	0	0	5.1	0.2	7.7	0.2	NA	
10/23/2009	6/2/2009	9500	EnCana	Crimson Federal 2-13	CT-9500	1/14/2010	1.4	0.6	0.0	0.0	0	0	1.4	0.6	2.1	0.7	NA	
10/23/2009	6/24/2009	9592	EnCana	Jonah Federal 2-8 X CF	MD-9592	1/14/2010	8.3	2.8	8.5	3.6	0	0	-0.2	-0.8	-0.2	-0.8	NA	Decrease due to decrease in production
10/23/2009	7/1/2009	9654	EnCana	Cabrito 8-25 CF	MD-9654	1/14/2010	13.9	3.7	16.5	4.8	0	0	-2.6	-1.1	-2.6	-1.1	NA	Decrease due to decrease in production
10/23/2009	9/3/2009	9903	EnCana	Stud Horse Butte 53-16 CF	MD-9903	1/14/2010	9.4	2.4	10.9	0.9	0	0	-1.5	1.5	-1.5	1.7	NA	Controlled Pneumatic Pumps
11/6/2009	10/10/2008	8553	EnCana	Jonah Storage Yard Engines	MD-8553	12/10/2009	0.2	0.5	0.0	0.0	0.0	0.0	0.2	0.5	0.3	0.6	NA	Addition of three engines - Volvo Penta TAAD741GE
11/6/2009	10/3/2009	9725	EnCana	Section 36 Water Management Facility	MD-9725	1/7/2010	11.9	15.2	0.0	0.0	11.9	3	0.0	12.2	0.0	13.4	NA	Modify Water Handling Facility
	10/7/2009	9983	EnCana	SOL 95-18 Water Treatment Facility	CT-9983	3/23/2010	18.2	6.6	0.0	0.0	0	0	18.2	6.6	27.3	7.3	NA	
NA	10/13/2009	10009	EnCana	Yellow Point 8-13 CF	MD-8199	11/25/2009	9.0	2.6	0.0	0.0	18.4	3.4	-9.4	-0.8	-9.4	-0.8	NA	Short Form, permitting at actual production instead of Maximum Equipment Capacity
NA	10/14/2009	10027	EnCana	Stud Horse Butte 2-34 CF	MD-7179	11/25/2009	9.6	3.4	9.4	3.0	0	0	0.2	0.4	0.3	0.4	NA	Short Form
NA	11/2/2009	10105	EnCana	Stud Horse Butte 11-17 CF	MD-8202	11/30/2009	28.1	7.3	0.0	0.0	30.5	6.2	-2.4	1.1	-2.4	1.2	NA	
12/10/2009	11/16/2009	10149	EnCana	Cabrito 61-13	CT-10149	2/5/2010	4.9	1.4	0.0	0.0	0	0	4.9	1.4	7.4	1.5	NA	
NA	11/23/2009	10159	EnCana	Jonah Federal 5-4 CF	MD-7972	12/11/2009	7.6	1.5	0.0	0.0	28.2	6.3	-20.6	-4.8	-20.6	-4.8	NA	Short Form
NA	11/25/2009	10180	EnCana	Stud Horse Butte 3-36 CF	8760	2/19/2010	6.7	1.0	0.0	0.0	20.6	4.1	-13.9	-2.3	-13.9	-2.3	NA	Short Form
NA	11/25/2009	10179	EnCana	Stud Horse Butte 12-36 CF	MD-7974	12/11/2009	10.8	3.2	0.0	0.0	20.1	6.1	-17.3	-2.9	-17.3	-2.9	NA	Short Form
NA	12/2/2009	10195	EnCana	Stud Horse Butte 2-36 CF	MD-8759	2/19/2010	11.9	3.1	0.0	0.0	22.7	4.1	-10.8	-1.0	-10.8	-1.0	NA	Short Form
1/8/2010	12/3/2009	10192	EnCana	Stud Horse Butte 7-22 CF	MD-10192	5/28/2010	8.9	2.0	4.5	1.5	0	0	4.4	1.3	6.6	1.4	NA	
1/19/2010	12/18/2009	10216	EnCana	Stud Horse Butte 4-33 CF	MD-10261	2/23/2010	3.3	1.4	9.1	0.7	0	0	-5.8	0.7	-5.8	0.8	NA	
NA	12/16/2009	10251	EnCana	Stud Horse Butte 11-36 CF	MD-8441	1/4/2010	11.6	3.5	0.0	0.0	18.5	4.1	-6.9	-0.6	-6.9	-0.6	NA	Short Form
1/19/2010	12/23/2009	10261	EnCana	Jonah Federal 3-5 CF	MD-10261	2/23/2010	3.3	1.2	9.1	0.8	0	0	-5.8	0.4	-5.8	0.4	NA	
NA	1/28/2010	10349	EnCana	Stud Horse Butte 4-27 CF	MD-8104	2/25/2010	5.6	1.8	0.0	0.0	22.6	4.5	-17.0	-2.7	-17.0	-2.7	NA	Short Form
NA	2/4/2010	10384	EnCana	Stud Horse Butte 11-22 CF	MD-7348	2/25/2010	12.3	3.2	0.0	0.0	31.9	6.8	-19.6	-3.6	-19.6	-3.6	NA	Short Form
	1/21/2010	10324	EnCana	Temporaty Oil Storage Tanks	wv-10324	2/23/2010	4.8	0.0	0.0	0.0	0	0	4.8	0.0	7.2	0.0	NA	
NA	2/18/2010	10423	EnCana	Jonah Federal 4-18 CF	MD-10423	5/12/2010	10.0	1.3	19.5	0.5	0	0	-8.7	0.8	-8.7	0.9	NA	
NA	2/24/2010	10430	EnCana	Section 32 Methanol Tank	wv-10430	3/17/2010	0.5	0.0	0.0	0.0	0.3	0	0.2	0.0	0.3	0.0	NA	Adding 2 methanol tanks, 3 TEG tanks and 2 PG tanks
NA	2/24/2010	10431	EnCana	Jonah Federal 2-8 X CF	MD-9592	3/15/2010	19.3	3.0	0.0	0.0	8.3	2.8	11.0	0.2	11.0	0.2	NA	
NA	3/10/2010	10501	EnCana	Stud Horse Butte 07-36	MD-8467	2/23/2010	9.9	1.7	0.0	0.0	15.7	2.9	-5.8	-1.2	-5.8	-1.2	NA	Short Form
4/30/2010	3/17/2010	10517	EnCana	Jonah Federal 01-04X CF	MD-10517	6/2/2010	9.6	1.6	41.8	1.9	0	0	-32.2	-0.3	-32.2	-0.3	NA	consolidation- Flash emissions and pneumatic pumps now controlled
NA	3/18/2010	10402	EnCana	Stud Horse Butte 122-10WW	wv-10402	3/18/2010	0.3	0.3	0.0	0.0	0	0	0.3	0.3	0.4	0.3	NA	
NA	4/8/2010	10552	EnCana	Stud Horse Butte 03-27 CF	MD-7696	4/16/2010	25.2	2.9	0.0	0.0	24.9	4.8	0.3	-1.9	0.5	-1.9	NA	Short Form
NA	4/15/2010	10589	EnCana	Stud Horse Butte 04-9 CF	MD-8881	4/22/2010	24.5	4.7	0.0	0.0	20.1	4	4.4	0.7	6.6	0.8	NA	Short Form
NA	4/20/2010	10632	EnCana	Stud Horse Butte 4-36WW	wv-10632	5/12/2010	0.4	0.3	0.0	0.0	0	0	0.4	0.3	0.6	0.3	NA	
6/11/2010	5/11/2010	10700	EnCana	Tot Federal #1	MD-10700	7/16/2010	6.1	0.9	6.1	0.5	0	0	0.0	0.4	0.0	0.4	NA	
NA	5/13/2010	10699	EnCana	SAG 34-19	CT-7519	5/27/2010	11.3	2.2	0.0	0.0	12.8	0.9	-1.5	1.3	-1.5	1.3	NA	Short Form
NA	5/19/2010	10723	EnCana	Stud Horse Butte 07-15	MD-7692	5/27/2010	18.5	4.1	0.0	0.0	18.3	3.8	0.2	0.3	0.3	0.2	NA	
	6/1/2010	10709	EnCana	Section 36 Water Management Facility			10.9	25.3	0.0	0.0	11.9	15.2	-1.0	10.1	-1.5	11.1	NA	Modify Water Management Facility
6/25/2010	6/9/2010	10806	EnCana	Stud Horse Butte 1-32 CF	MD-10806	7/29/2010	12.3	2.5	29.4	4.3	0	0	-17.1	-1.8	-17.1	-1.8	NA	Short Form
7/30/2010	7/12/2010	10925	EnCana	Cabrito 13-19 CF	MD-10925	9/3/2010	24.0	3.6	52.5	2.5	0	0	-28.5	1.1	-28.5	1.2	NA	Consolidation
	7/21/2010		EnCana	Stud Horse Butte 53-16 CF	MD-9903	8/9/2010	23.9	4.4	0.0	0.0	9.4	2.4	14.5	2.0	21.8	2.2	NA	
NA	8/3/2010	11016	EnCana	Stud Horse Butte 1-29 CF	MD-8912	8/16/2010	22.6	5.1	0.0	0.0	23	4.3	-0.4	0.8	-0.4	0.8	NA	Short Form
	8/3/2010	11017	EnCana	SOL 95-18 Water Treatment Facility	CT-9983		17.2	5.6	0.0	0.0	18.2	6.6	-1.0	-1.0	-1.0	-1.0	NA	Replaced 3406 engines with a 3412TA from Section 36
NA	8/4/2010	11014	EnCana	Stud Horse Butte 13-26 CF	MD-8200	8/11/2010	27.3	3.8	0.0	0.0	31.8	7.6	-4.5	-3.8	-4.5	-3.8	NA	
8/27/2010	8/5/2010	11015	EnCana	Stud Horse Butte 4-20 CF	MD-11015	9/20/2010	13.6	4.0	21.9	0.5	0	0	-8.3	3.5	-8.3	3.9	NA	
NA	8/10/2010	11048	EnCana	Stud Horse Butte 13-26 CF	MD-8110	8/20/2010	10.9	3.0	0.0	0.0	45.1	8.8	-16.2	-5.8	-16.2	-5.8	NA	
NA	8/11/2010	11034	EnCana	Section 32 Storage Yard (Previously Section 32 Methanol Tank Storage Facility)			0.7	0.5	0.0	0.0	0.5	0	0.2	0.5	0.3	0.6	NA	Adding generator engine
NA	8/26/2010	11102	EnCana	Stud Horse Butte 48-16	CT-7162	9/29/2010	6.5	0.8	0.0	0.0	11	0.6	-4.5	0.2	-4.5	0.2	NA	
11/19/2010	9/9/2010	11150	EnCana	Stud Horse Butte 15-27	MD-11150	12/22/2010	18.0	2.6	16.7	2.4	0	0	1.3	0.2	2.0	0.2	NA	
NA	9/9/2010	11149	EnCana	Stud Horse Butte 1-34 CF	MD-9216		9.4	1.5	0.0	0.0	9.9	2.3	-0.5	-0.8	-0.5	-0.8	NA	Short Form
NA	9/20/2010	11161	EnCana	Stud Horse Butte 11-20 CF	MD-8490	10/28/2010	20.5	5.1	0.0	0.0	51.3	8.9	-22.8	-3.8	-22.8	-3.8	NA	Short Form
NA	9/29/2010	11205	EnCana	Stud Horse Butte 12-29 CF	MD-8776	11/5/2010	19.4	3.4	0.0	0.0	23.1	4.4	-3.7	-1.0	-3.7	-1.0	NA	Short Form
1/4/2011	10/12/2010	11250	EnCana	Stud Horse Butte 11-17 CF	MD-11250	2/8/2011	17.6	5.8	0.0	0.0	30.5	6.2	-12.9	-0.4	-12.9	-0.4	NA	Short Form
NA	10/13/2010	11248	EnCana	Stud Horse Butte 2-33 CF	MD-11248	12/28/2010	7.9	1.7	13.5	1.9	0	0	-5.6	-0.2	-5.6	-0.2	NA	Short Form
NA	10/14/2010	11249	EnCana	Stud Horse Butte 10-33 CF	MD-11249	12/29/2010	8.0	1.0	13.9	0.6	10.1	4.4	-24.0	-3.2	-24.0	-1.2	NA	Short Form
1/4/2011	10/19/2010	11276	EnCana	Cabrito 8-25 CF	MD-11276	2/8/2011	16.9	5.1	0.0	0.0	13.9	2.7	3.0	1.4	4.5	1.5	NA	Short Form
1/4/2011	10/25/2010	11289	EnCana	Stud Horse Butte 16-18 CF	MD-11289	2/8/2011	3.0	1.4	0.0	0.0	9.4	2.6	-5.6	-1.2	-5.6	-1.2	NA	
1/7/2011	11/12/2010	11399	EnCana	Stud Horse Butte 10-35 CF	MD-11399	2/8/2011	20.5	2.9	97.8	9.1	0	0	-77.3	-6.2	-77.3	-6.2	NA	Consolidation
1/10/2011	11/12/2010	11400	EnCana	Cabrito 14-25 CF	MD-11400	3/4/2011	14.3	3.6	115.3	10.4	0.0	0.0	-101.0	-6.8	-101.0	-6.8	NA	Consolidation
1/10/2011	11/15/2010	11420	EnCana	Stud Horse Butte 01-35 CF	MD-11420	3/4/2011	16.6	3.1	82.7	7.0	0.0	0.0	-66.1	-3.9	-66.1	-3.9	NA	Consolidation

2/14/2011	11/16/2010	11435	Encana	Cabrito 13-30 CF	MD-11435	3/22/2011	23.6	4.1	0.0	0.0	43.2	8.6	-19.6	-4.5	-19.6	-4.5	NA	Short Form
1/31/2011	11/24/2010	11424	Encana	Stud Horse Butte 8-14 CF	MD-11424	3/9/2011	9.0	3.0	0.0	0.0	19.3	3.7	-10.3	-0.7	-10.3	-0.7	NA	2010 Short Form
1/31/2011	11/22/2010	11426	Encana	Stud Horse Butte 12Z-10 CF	MD-11426	3/9/2011	12.9	4.1	0.0	0.0	18.2	3.7	-5.3	0.4	-8.0	0.4	NA	Short Form
1/14/2011	12/7/2010	11469	Encana	SAG 73-20 CF	CT-11469	2/25/2011	4.1	1.2	0.0	0.0	0.0	0.0	4.1	1.2	6.2	1.3	NA	2010 Full Application (new facility)
1/14/2011	12/8/2010	11467	Encana	SAG 17-30 CF	CT-11467	2/25/2011	7.2	2.1	0.0	0.0	0.0	0.0	7.2	2.1	10.8	2.3	NA	2010 Full Application (new facility)
1/24/2011	12/13/2010	11408	Encana	Stud Horse Butte 16-34R CF	MD-11408	3/1/2011	9.0	2.4	0.0	0.0	19.4	4.0	-10.4	-1.6	-10.4	-1.6	NA	2010 Short Form
1/31/2011	12/14/2010	11516	Encana	Stud Horse Butte 2-34 CF	MD-111516	3/9/2011	15.0	4.2	0.0	0.0	9.6	3.4	5.4	0.8	8.1	0.9	NA	2010 Short Form
4/4/2011	1/13/2010	11623	Encana	Stud Horse Butte 15-19 CF	MD-11623	5/18/2011	9.3	2.1	0.0	0.0	11.0	2.6	-1.7	-0.5	-1.7	-0.5	NA	2010 Short Form
4/4/2011	1/13/2011	11622	Encana	Stud Horse Butte 7-26 CF	MD-11622	5/10/2011	15.3	4.6	0.0	0.0	38.1	8.6	-22.8	-4.0	-22.8	-4.0	NA	2010 Short Form
3/28/2011	1/14/2011	11614	Encana	Corona-Stud Horse Butte 10-30 CF	AP-11614		12.3	3.2	0.0	0.0	27.3	0.3	-15.0	-5.1	-15.0	-5.1	NA	2010 Short Form
4/11/2011	1/20/2011	11659	Encana	Stud Horse Butte 4-28 CF	MD-11659	5/18/2011	8.4	2.9	43.2	4.5	0.0	0.0	-34.8	-1.1	-34.8	-1.1	NA	2010 Short Form
4/18/2011	1/24/2011	11658	Encana	Corona - Stud Horse Butte 10-31 CF	MD-11658	5/24/2011	11.7	3.5	0.0	0.0	33.5	7.1	-21.8	-3.6	-21.8	-3.6	NA	2010 Short Form
4/11/2011	1/25/2011	11660	Encana	Stud Horse Butte 4-35 CF	MD-11660	5/18/2011	10.0	2.1	22.3	1.8	0.0	0.0	-12.3	0.3	-12.3	0.3	NA	2010 Full Application
11/11/2011	2/15/2010	11772	Encana	Section 26 WMF			36.6	29.5	0.0	0.0	15.4	24.8	21.2	4.7	31.8	5.2	NA	
4/18/2011	3/1/2011	11801	Encana	Jonah Federal 5-6 CF	MD-11801	5/24/2011	8.0	2.0	0.0	0.0	14.2	2.9	-6.2	-0.9	-6.2	-0.9	NA	
5/9/2011	3/9/2011	11825	Encana	Jonah Federal 45-08 H	CT-11825	6/14/2011	5.1	1.5	0.0	0.0	0.0	0.0	5.1	1.5	7.7	1.7	NA	
5/9/2011	3/11/2011	11845	Encana	Jonah Federal 13-7	MD-11845	6/14/2011	5.6	1.2	5.9	1.2	0.0	0.0	-0.3	0.0	-0.3	0.0	NA	
5/16/2011	3/29/2011	11896	Encana	Stud Horse Butte 32-10	MD-11896	6/21/2011	4.5	1.2	0.0	0.0	5.1	1.0	-0.6	0.2	-0.6	0.2	NA	
5/16/2011	4/5/2011	11934	Encana	Stud Horse Butte 15-28 CF	MD-11934	6/21/2011	9.5	2.0	0.0	0.0	18.7	4.7	-9.2	-1.9	-9.2	-1.9	NA	
5/16/2011	4/13/2011	11950	Encana	Stud Horse Butte 12-15 CF	MD-11950	6/21/2011	16.4	4.2	0.0	0.0	27.4	6.9	-11.0	-2.7	-11.0	-2.7	NA	
7/18/2011	5/16/2011	12065	Encana	SAG 36-19	MD-12065	8/24/2011	9.9	3.4	0.0	0.0	11.3	2.2	-1.4	1.2	-1.4	1.3	NA	2010 Short Form
8/22/2011	5/23/2011	12087	Encana	Stud Horse Butte 04-09 CF	MD-12087	9/28/2011	18.6	5.9	0.0	0.0	24.5	4.7	-5.9	1.2	-5.9	1.3	NA	2010 Short Form
7/18/2011	5/27/2011	12080	Encana	Yellow Point 04-12 CF	MD-12080	8/24/2011	8.9	2.3	0.0	0.0	31.9	4.4	-23.0	-2.1	-23.0	-2.1	NA	2010 Short Form
7/25/2011	6/2/2011	12103	Encana	Stud Horse Butte 01-27 CF	MD-12103	8/30/2011	10.5	2.9	0.0	0.0	19.1	5.0	-8.6	-2.1	-8.6	-2.1	NA	2010 Short Form
7/18/2011	6/2/2011	12102	Encana	Stud Horse Butte 03-34 CF	MD-12102	8/24/2011	9.0	2.6	0.0	0.0	14.3	4.2	-4.5	-1.6	-4.5	-1.6	NA	2010 Short Form
8/15/2011	6/8/2011	12147	Encana	Stud Horse Butte 04-26 CF	MD-12147	9/20/2011	12.5	3.0	0.0	0.0	27.5	0.9	-15.0	-5.1	-15.0	-5.1	NA	2010 Short Form
8/15/2011	6/8/2011	12148	Encana	Stud Horse Butte 07-22 CF	MD-12148	9/28/2011	16.0	4.9	0.0	0.0	8.9	2.8	7.1	2.1	10.7	2.3	NA	2010 Short Form
8/15/2011	6/14/2011	12143	Encana	SAG 59-29	MD-12143	9/28/2011	5.7	1.5	0.0	0.0	0.0	0.0	5.7	1.5	8.6	1.7	NA	2010 Full Application
8/15/2011	6/16/2011	12166	Encana	Stud Horse Butte 04-33 CF	MD-12166	9/28/2011	7.7	2.5	0.0	0.0	3.3	1.4	4.4	1.1	6.6	1.2	NA	2010 Short Form
8/15/2011	6/30/2011	12217	Encana	Stud Horse Butte 53-16 CF	MD-12217	9/28/2011	14.5	4.7	0.0	0.0	23.9	4.4	-9.4	0.3	-9.4	0.3	NA	2010 Short Form
8/15/2011	6/30/2011	12216	Encana	Cabrito 14-25 CF	MD-12216	9/28/2011	12.2	3.0	0.0	0.0	14.3	3.6	-2.1	-0.6	-2.1	-0.6	NA	2010 Short Form
9/6/2011	7/8/2011	12241	Encana	Yellow Point 07-02 CF	MD-12241	10/11/2011	4.4	1.3	4.9	1.4	0.0	0.0	-0.5	-0.1	-0.5	-0.1	NA	2010 Short Form
	7/11/2011		Encana	Hacienda 14-30			6.4	2.7	9.0	1.1	0.0	0.0	-3.4	1.6	-3.4	1.8	NA	
8/25/2011	7/14/2011	12233	Encana	Stud Horse Butte 11-26 CF	MD-12233	10/4/2011	7.4	2.0	0.0	0.0	18.9	3.0	-11.5	-0.2	-11.5	-0.2	NA	2010 Short Form
9/26/2011	8/3/2011	12305	Encana	Stud Horse Butte 16-28/9-28 CF	MD-12305	11/1/2011	7.6	2.5	0.0	0.0	7.3	2.2	0.3	0.3	0.5	0.3	NA	2010 Short Form
10/24/2011	8/4/2011	12298	Encana	Stud Horse Butte 03-27 CF	MD-12298	11/29/2011	14.0	3.3	0.0	0.0	25.2	2.9	-11.2	0.4	-11.2	0.4	NA	2010 Short Form
10/3/2011	8/8/2011	12339	Encana	Stud Horse Butte 01-35 CF	MD-12339	11/8/2011	11.6	3.5	0.0	0.0	16.6	3.1	-5.0	0.4	-5.0	0.4	NA	2010 Short Form
10/31/2011	9/1/2011	12432	Encana	Stud Horse Butte 09-33	MD-12432	12/6/2011	7.4	2.0	10.9	3.0	0.0	0.0	-11.5	-0.2	-11.5	-0.2	NA	2010 Short Form
10/31/2011	9/15/2011	12449	Encana	Stud Horse Butte 11-34 CF	MD-12449	12/6/2011	9.7	2.0	0.0	0.0	17.8	3.7	-8.1	-0.9	-8.1	-0.9	NA	2010 Short Form
11/14/2011	9/27/2011	12486	Encana	Stud Horse Butte 02-28/10-28 CF	MD-12486	12/28/2011	12.3	4.2	0.0	0.0	18.9	4.6	-6.6	-0.4	-6.6	-0.4	NA	2010 Short Form
11/14/2011	9/30/2011	12536	Encana	Jonah Federal 24-09 Single Well Facility	MD-12536	12/28/2011	5.0	1.4	0.0	0.0	0.0	0.0	5.0	1.4	7.5	1.5	NA	2010 Full Application
11/21/2011	10/6/2011	AP-12604	Encana	Stud Horse Butte 01-36/19-36 CF	MD-12604	12/28/2011	11.3	3.4	0.0	0.0	24.7	4.5	-13.4	-1.1	-13.4	-1.1	NA	2010 Short Form
11/21/2011	10/10/2011	AP-12614	Encana	Stud Horse Butte 01-34 CF	MD-12614	12/28/2011	6.3	1.8	0.0	0.0	9.4	1.5	-3.1	0.3	-3.1	0.3	NA	2010 Short Form
	10/14/2011		Encana	Section 18 Water Management Facility			27.1	10.5	0.0	0.0	16.9	5.3	5.2	5.2	7.8	5.7	NA	Facility Application
12/5/2011	11/9/2011	AP-12697	Encana	Stud Horse Butte 12-36 CF	MD-12697	1/10/2012	11.6	3.5	0.0	0.0	10.8	3.2	0.8	0.3	1.2	0.3	NA	2010 Short Form
12/23/2011	11/14/2011	AP-12705	Encana	Stud Horse Butte 06-35 CF	MD-12705	1/31/2012	10.8	2.8	25.7	2.5	0.0	0.0	-15.7	0.3	-15.7	0.3	NA	2010 Short Form
1/9/2012	12/13/2011	AP-12859	Encana	Stud Horse Butte 67-11 CF	CT-12859	2/14/2012	7.3	1.9	0.0	0.0	0.0	0.0	7.3	1.9	11.0	2.1	NA	2010 Full Application
1/23/2012	12/20/2011	AP-12876	Encana	Stud Horse Butte 72-09 CF			16.7	5.7	0.0	0.0	0.0	0.0	16.7	5.7	25.1	6.3	NA	2010 Full Application
1/30/2012	1/10/2012	AP-12931	Encana	Stud Horse Butte 16-32 CF			4.9	1.6	17.1	2.1	0.0	0.0	-12.2	-0.5	-12.2	-0.5	NA	2010 Full Application
1/30/2012	1/11/2012	AP-12919	Encana	Stud Horse Butte 04-27 CF			5.0	1.5	0.0	0.0	5.6	1.0	-0.6	-0.3	-0.6	-0.3	NA	2010 Short Form
2/6/2012	1/19/2012	AP-12948	Encana	Jonah Federal 08-07 CF	MD-12948	3/19/2012	7.4	2.5	24.3	2.7	0.0	0.0	-16.9	-0.2	-16.9	-0.2	NA	2010 Full Application
4/9/2012	3/1/2012	AP-13186	Encana	Stud Horse Butte 41-11 Single Well Facility	MD-13186	5/15/2012	3.0	1.3	0.0	0.0	0.0	0.0	3.0	1.3	5.7	1.4	NA	2010 Full Application
6/18/2012	3/7/2012	AP-13195	Encana	Stud Horse Butte 12-36/29-35 CF	MD-13195	7/24/2012	11.1	2.9	0.0	0.0	11.6	3.5	-0.5	-0.6	-0.5	-0.6	NA	2010 Short Form
6/18/2012	3/8/2012	AP-13194	Encana	Jonah Federal 05-04 CF	MD-13194	7/24/2012	8.3	2.7	0.0	0.0	7.6	1.5	0.7	1.2	1.1	1.4	NA	2010 Short Form
	3/14/2012		Encana	Portable Water Pump Generator			0.5	0.5	0.0	0.0	0.0	0.0	0.5	0.5	0.8	0.6	NA	Full Application
	3/15/2012		Encana	SHH 2-36			0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.3	0.5	0.3	NA	Full Application
	3/15/2012		Encana	CAH 14-25			0.3	0.2	0.0	0.0	0.0	0.0	0.3	0.2	0.5	0.2	NA	Full Application
	3/19/2012		Encana	SHH 15-27			0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.3	0.5	0.3	NA	Full Application
6/18/2012	5/11/2012	AP-13400	Encana	Cabrito 02-31 CF	MD-13400	7/24/2012	7.1	2.1	0.0	0.0	8.6	1.9	-1.5	0.2	-1.5	0.3	NA	2010 Short Form
6/18/2012	5/14/2012	AP-13455	Encana	Stud Horse Butte 12-15 CF	MD-13455	7/24/2012	9.7	3.3	0.0	0.0	16.4	4.2	-6.7	-0.9	-6.7	-0.9	NA	2010 Short Form
8/6/2012	6/18/2012	AP-13565	Encana	Stud Horse Butte 06-32 CF	MD-13565	9/17/2012	9.7	3.3	60.2	6.9	0.0	0.0	-50.5	-3.6	-50.5	-3.6	NA	2010 Full Application
7/30/2012	6/22/2012	AP-13564	Encana	Stud Horse Butte 11-34 CF	MD-13564	9/5/2012	4.5	1.6	23.9	2.4	0.0	0.0	-19.4	-0.8	-19.4	-0.8	NA	2010 Full Application
8/20/2012	7/3/2012	AP-13619	Encana	Stud Horse Butte 07-15 CF	MD-13619	2/28/2013	13.1	5.1	0.0	0.0	18.5	4.1	-5.4	1.0	-5.4	1.2	NA	2010 Short Form
8/20/2012	7/10/2012	AP-13639	Encana	Stud Horse Butte 11-34 CF	MD-13639	2/28/2013	9.6	2.9	0.0	0.0	9.7	2.8	-0.1	0.1	-0.1	0.1	NA	2010 Short Form
8/20/2012	7/13/2012	AP-13635	Encana	Stud Horse Butte 02-34 CF	MD-13635	2/28/2013	8.2	2.9	0.0	0.0	15.0	4.2	-6.8	-1.3	-6.8	-1.3	NA	2010 Short Form
1/14/2013	7/31/2012	AP-13716	Encana	Cabrito 72-29 CF			41.6	14.2	0.0	0.0	5.6	1.5	36.0	12.7	54.0	14.0	NA	2010 Full Application
9/17/2012	8/16/2012	AP-13776	Encana	Cabrito 61-13 CF	MD-13776	10/30/2012	10.7	2.4	0.0	0.0	4.9	1.4	5.8	1.0	8.7	1.1	NA	2010 Short Form
10/8/2012	8/22/2012	AP-13795	Encana	Stud Horse Butte 13-26 CF	MD-13795	11/14/2012	15.8	4.4	0.0	0.0	27.3	3.8	-11.5	0.6	-11.5	0.7	NA	2010 Short Form
12/3/2012	9/18/2012	AP-13923	Encana	Stud Horse Butte 10-33 CF	MD-13923	1/8/2013	8.1	2.4	0.0	0.0	8.0	1.4	0.1	1.0	0.1	1.1	NA	2010 Short Form
11/16/2012	9/20/2012	AP-13961	Encana	Portable Rod Pump Engines			1.0	3.0	0.0	0.0	0.0	0.0	1.0	3.0	1.5	3.3	NA	Full Permit Application
1/18/2013	10/15/2012	AP-14082	Encana	CAH 61-13 Flow Back Cooler			0.5	0.3	0.0	0.0	0.0	0.0	0.5	0.3	0.8	0.3	NA	Full Permit Application
12/28/2012	10/26/2012	AP-14051	Encana	Stud Horse Butte 12Z-10 CF	MD-14051	2/4/2013	9.5	4.6	0.0	0.0	13.1	4.1	-3.6	0.5	-3.6	0.6	NA	2010 Short Form
1/18/2013	11/9/2012	AP-14133	Encana	Stud Horse Butte 53-16 CF	MD-14133	2/26/2013	13.7	4.3	0.0	0.0	14.5	4.6	-0.8	-0.3	-0.8	-0.3	NA	2010 Short Form
12/28/2012	11/9/2012	AP-14115	Encana	Jonah Ridge Tower			0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	NA	Full Permit Application
	11/12/2012		Encana	CAH 72-29 WH			0.5	1.4	0.0	0.0	0.0	0.0	0.5	1.4	0.8	1.5	NA	Full Permit Application
3/25/2013	1/3/2013	AP-14305	Encana	Stud Horse Butte 02-36 CF	MD-14305	4/30/2013	11.7	3.4	0.0	0.0	12.2	3.3	-0.5	0.1	-0.5	0.1	NA	2010 Short Form
4/29/2013	2/8/2013	AP-14485	Encana	Stud Horse Butte 11-17 CF	MD-14485	6/4/2013	14.9	5.5	0.0	0.0	17.6	5.0	-2.7	-0.3	-2.7	-0.3	NA	2010 Short Form
	2/8/2013		Encana	Jonah and NPL Portable Engine			1.4	1.0	0.0	0.0	0.0	0.0	1.4	1.0	2.1	1.1	NA	Full Permit Application
	3/26/2013		Encana	Stud Horse Butte 07-26 CF			1.4	1.0	0.0	0.0	0.0	0.0	1.4	1.0	2.1	1.1	NA	2010 Short Form
6/17/2013	3/28/2013	AP-14673	Encana	Stud Horse Butte 04-26 CF	MD-14673	7/23/2013	11.4	3.7	0.0	0.0	15.3	4.6	-3.9	-0.9	-3.9	-0.9	NA	2010 Short Form
7/16/2013	4/18/2013	AP-14815	Encana	Stud Horse Butte 16-33 CF	MD-14815	8/20/2013	13.2	4.0	0.0	0.0	12.5	3.7	0.7	0.3	1.1	0.3	NA	2010 Short Form
7/16/2013	4/22/2013	AP-14911	Encana	Stud Horse Butte 67-11 CF	MD-14911	8/20/2013	6.2	1.9	9.4	2.3	0.0	0.0	-3.2	-0.4	-3.2	-0.4	NA	Full Permit Application
7/22/2013	5/6/2013	AP-14920	Encana	Stud Horse Butte 67-11 CF	MD-14920	8/27/2013	13.1	5.1	0.0	0.0	7.3	1.9	5.8	3.2	8.7	3.5	NA	2010 Short Form
7/22/2013	5/6/2013	AP-14921	Encana	Stud Horse Butte 21-26 CF	MD-14921	8/27/2013	10.6	3.1	0.0	0.0	7.4	2.8	3.2	0.3	4.9	0.3	NA	2010 Short Form
9/5/2013	6/3/2013	AP-15086	Encana	Stud Horse Butte 10-35 CF	MD-15086	9/10/2013	9.9	2.6	0.0	0.0	20.5	2.9	-10.6	-0.3	-10.6	-0.3	NA	2010 Short Form
9/5/2013	6/6/2013	AP-15085	Encana	Stud Horse Butte 01-35 CF	MD-15085	9/10/2013	11.0	3.3	0.0	0.0	11.6	3.5	-0.6	-0.2	-0.6	-0.2	NA	2010 Short Form
	6/18/2013		Encana	Jonah and NPL Portable Cooler Engines			3.7	2.6	0.0	0.0	0.0	0.0	3.7	2.6	5.5	2.9	NA	Full Permit Application
10/7/2013	7/1/2013	AP-15229	Encana	Stud Horse Butte 06-32 CF	MD-15229	11/13/2013	19.7	5.3	21.0	5.0	20.7	6.7	-22.0	-6.4	-22.0	-6.4	NA	2010 Short Form
10/7/2013	7/3/2013	AP-15215	Encana	Stud Horse Butte 10-33 CF	MD-15215	11/13/2013	16.4	4.8	0.0	0.0	8.1	2.4	8.3	2.4	12.5	2.6	NA	2010 Short Form

10/28/2013	7/16/2013	AP-15280	Encana	SAG 05-28 CF	MD-15280	12/10/2013	4.2	2.1	12.0	0.4	0.0	0.0	-7.0	1.7	-7.8	1.8	NA	Full Permit Application
10/28/2013	7/16/2013	AP-15281	Encana	Stud Horse Butte 04-33 CF	MD-15281	12/10/2013	7.0	3.0			8.2	3.0	-1.2	-0.8	-1.2	-0.8	NA	2010 Short Form
10/28/2013	7/18/2013	AP-15282	Encana	Cabrito 13-30 CF	MD-15282	12/10/2013	10.1	6.5	0.0	0.0	32.8	8.0	-14.7	-1.5	-14.7	-1.5	NA	2010 Short Form
10/28/2013	8/1/2013	AP-15335	Encana	Stud Horse Butte 03-36 CF	MD-15335	12/10/2013	6.3	2.1	0.0	0.0	4.2	1.0	2.1	0.3	2.1	0.3	NA	2010 Short Form
10/28/2013	8/7/2013	AP-15369	Encana	Stud Horse Butte 06-35 CF	MD-15369	12/10/2013	10.9	4.1	0.0	0.0	6.6	2.0	4.3	1.3	6.5	1.4	NA	2010 Short Form
5/2/2014	8/13/2013	AP-15410	Encana	Cabrito 72-29 CF	MD-15410	6/3/2014	21.4	8.9	0.0	0.0	41.6	14.2	-28.2	-5.3	-28.2	-5.3	NA	2010 Short Form
11/4/2013	8/14/2013	AP-15393	Encana	Stud Horse Butte 02-33 CF	MD-15393	12/11/2013	3.4	1.7	0.0	0.0	6.8	1.4	-3.4	0.3	-3.4	0.3	NA	2010 Short Form
11/4/2013	8/20/2013	AP-15415	Encana	Stud Horse Butte 07-16 CF	MD-15415	12/11/2013	8.0	3.6	0.0	0.0	12.7	5.5	-4.7	-1.9	-4.7	-1.9	NA	2010 Short Form
11/4/2013	8/22/2013	AP-15411	Encana	Stud Horse Butte 15-27 CF	MD-15411	12/11/2013	16.9	4.8	0.0	0.0	15.7	2.8	1.2	2.0	1.8	2.2	NA	2010 Short Form
	9/13/2013		Encana	Section 32 Inventory Yard			1.9	1.3	0.0	0.0	0.0	0.0	1.9	1.3	2.9	1.4	NA	Full Application
12/2/2013	10/2/2013	AP-15548	Encana	Yellow Point 117-12V Single Well Facility			6.5	2.3	0.0	0.0	0.0	0.0	6.5	2.3	9.8	2.6	NA	Full Application
1/13/2014	11/11/2013	AP-15689	Encana	Stud Horse Butte 04-27 CF			15.7	6.3	0.0	0.0	21.9	7.7	-6.2	-1.4	-6.2	-1.4	NA	2010 Short Form
1/13/2014	11/19/2013	AP-15708	Encana	Stud Horse Butte 13-26 CF			8.6	3.4	0.0	0.0	14.1	4.4	-5.5	-1.0	-5.5	-1.0	NA	2010 Short Form
2/14/2014	12/17/2013	AP-15863	Encana	Cabrito 08-25 CF	MD-15863	3/25/2014	12.3	3.7	0.0	0.0	14.3	5.1	-2.0	-1.4	-2.0	-1.4	NA	2010 Short Form
2/14/2014	12/19/2013	AP-15862	Encana	SAG 34-19 CF	MD-15862	3/25/2014	7.4	3.5	0.0	0.0	7.3	3.4	0.1	0.1	0.2	0.1	NA	2010 Short Form
3/28/2014	1/30/2014	AP-15967	Encana	Cabrito 61-13 CF			13.6	4.4	0.0	0.0	8.7	2.7	4.9	1.7	7.4	1.9	NA	2010 Short Form
4/18/2014	2/20/2014	AP-16093	Encana	Stud Horse Butte 08-14 CF			8.8	3.6	0.0	0.0	7.4	3.0	1.4	0.6	2.1	0.7	NA	2010 Short Form
4/18/2014	3/4/2014	AP-16085	Encana	Stud Horse Butte 10-28 CF			10.9	4.1	0.0	0.0	37.6	9.9	-26.7	-5.8	-26.7	-5.8	NA	2010 Short Form
5/2/2014	3/17/2014	AP-16161	Encana	Stud Horse Butte 07-26 CF	MD-16161	6/3/2014	11.0	4.4	0.0	0.0	10.5	3.7	0.5	0.7	0.8	0.8	NA	2010 Short Form
5/16/2014	4/10/2014	AP-16227	Encana	Antelope 91-29H			7.9	3.3	0.0	0.0	0.0	0.0	7.9	3.3	11.9	3.6	NA	Full Application
5/23/2014	4/11/2014	AP-16228	Encana	Stud Horse Butte 4-28CF			7.0	3.2	0.0	0.0	6.8	2.9	0.2	0.3	0.3	0.3	NA	2010 Short Form
				Jonah Field EDA& M Program	MD-13171		535.8	0.0	134.8	0.0	0.0	0.0	401.0	0.0	-401.0	0.0	NA	
6/13/2014	5/9/2014	AP-16363	Encana	Stud Horse Butte 16-26 CF	MD-16363	7/15/2014	6.3	2.3	0.0	0.0	11.5	2.9	-5.2	-0.6	-5.2	-0.6	NA	2010 Short Form
6/13/2014	5/9/2014	AP-16361	Encana	Cabrito 13-19 CF			13.9	3.7	0.0	0.0	21.5	3.6	-7.6	0.1	-7.6	0.1	NA	2010 Short Form
	5/21/2014	AP-16435	Jonah Energy	Stud Horse Butte 08-14 CF	MD-16435 [corrected]	10/27/2014	9.1	3.7	0.0	0.0	8.8	3.6	0.3	0.1	0.4	0.2	NA	2010 Short Form
	5/22/2014	AP-16502	Jonah Energy	Jonah Office Building	MD-16502	9/5/2014	0.0	1.6	0.0	0.0	0.1	0.2	-0.1	1.4	-0.1	1.5	NA	Full Application - Engine Only
	5/27/2014	AP-16510	Jonah Energy	CAH 72-29 VRU Engine	MD-16510	9/12/2014	0.7	0.5	0.0	0.0	0.0	0.0	0.7	0.5	1.1	0.6	NA	Full Application - Engine Only
	6/3/2014	AP-16563	Jonah Energy	Stud Horse Butte 122-10 CF	MD-16563	10/21/2014	5.7	3.2	0.0	0.0	6.0	4.6	-0.3	-1.4	-0.3	-1.4	NA	Pinedale AQD Short Form
	6/9/2014	AP-16612	Jonah Energy	Stud Horse Butte 32-10	MD-16612	10/21/2014	5.1	1.7	0.0	0.0	4.5	1.2	0.6	0.5	0.9	0.6	NA	Pinedale AQD Short Form
	6/19/2014	AP-16686	Jonah Energy	Cabrito 13-30 CF			20.1	6.9	0.0	0.0	18.1	6.5	2.0	0.4	3.0	0.4	NA	Pinedale AQD Short Form
	6/23/2014	AP-16599	Jonah Energy	Stud Horse Butte 13-26 CF	MD-16599	10/21/2014	8.0	3.6	0.0	0.0	8.6	3.4	-0.6	0.2	-0.6	0.2	NA	Pinedale AQD Short Form
	6/24/2014	AP-16602	Jonah Energy	CAH 72-29 CF	MD-16602	10/21/2014	30.2	8.5	0.0	0.0	21.4	8.9	8.8	-0.4	13.2	-0.4	NA	Pinedale AQD Short Form
11/20/2014	6/26/2014	AP-16644	Jonah Energy	SIHI 6-32 CF	MD-16644	12/30/2014	9.3	3.6	173.4	14.9	0.0	0.0	-164.1	-11.3	-164.1	-11.3	NA	Pinedale AQD Short Form
	7/2/2014	AP-16632	Jonah Energy	SIHI 11-17 CF	MD-16632	10/28/2014	15.8	5.8	0.0	0.0	14.9	5.5	0.9	0.3	1.4	0.3	NA	Pinedale AQD Short Form
	7/2/2014	AP-16633	Jonah Energy	SIHI 7-16 CF	MD-16633	10/28/2014	11.3	6.0	0.0	0.0	8.0	3.6	3.3	2.4	0.8	2.6	NA	Pinedale AQD Short Form
	7/14/2014	AP-16726	Jonah Energy	SIHI 6-26 CF			29.7	8.3	0.0	0.0	34.8	11.5	-5.1	-3.2	-5.1	-3.2	NA	Pinedale AQD Short Form
	7/15/2014	AP-16730	Jonah Energy	SIHI 13-35 CF	MD-16730	11/12/2014	7.4	3.0	24.8	5.1	--	--	-17.4	-2.1	-17.4	-2.1	NA	Pinedale AQD Short Form
	7/16/2014	AP-16731	Jonah Energy	SIHI 4-35 CF	MD-16731	11/12/2014	6.6	2.6	0.0	0.0	10.0	2.1	-3.4	0.5	-3.4	0.6	NA	Pinedale AQD Short Form
	7/17/2014	AP-16719	Jonah Energy	YP 4-12 CF	MD-16719	11/12/2014	6.1	2.4	0.0	0.0	15.4	4.6	-9.3	-2.2	-9.3	-2.2	NA	Pinedale AQD Short Form
10/24/2014	7/28/2014	AP-16760	Jonah Energy	SIHI 16-32			2.0	1.4	0.0	0.0	1.8	1.6	1.0	-0.2	1.5	-0.2	NA	Pinedale AQD Short Form
11/7/2014	8/11/2014	AP-16871	Jonah Energy	SIHI 1-34	MD-16871	12/9/2014	6.6	3.4	0.0	0.0	4.8	1.8	1.8	1.6	2.7	1.8	NA	Pinedale AQD Short Form
11/7/2014	8/13/2014	AP-16870	Jonah Energy	SIHI 13-34	MD-16870	12/9/2014	5.6	2.8	0.0	0.0	7.1	2.9	-1.5	-0.1	-1.5	-0.1	NA	Pinedale AQD Short Form
11/7/2014	8/13/2014	AP-16868	Jonah Energy	YP B-13	MD-16868	12/9/2014	6.5	2.6	0.0	0.0	23.4	2.6	-16.9	0.0	-16.9	0.0	NA	Pinedale AQD Short Form
11/14/2014	8/18/2014	AP-16887	Jonah Energy	SIHI 1-29	MD-16887	12/16/2014	16.7	6.1	0.0	0.0	17.9	5.1	-1.2	1.0	-1.2	1.1	NA	Pinedale AQD Short Form
11/14/2014	8/18/2014	AP-16895	Jonah Energy	SIHI 124-11	MD-16895	12/16/2014	5.3	2.9	0.0	0.0	25.9	3.8	-20.6	-0.9	-20.6	-0.9	NA	Pinedale AQD Short Form
11/14/2014	8/18/2014	AP-16896	Jonah Energy	SIHI 2-34	MD-16896	12/16/2014	7.6	3.4	0.0	0.0	5.7	2.0	1.9	0.5	2.9	0.6	NA	Pinedale AQD Short Form
11/14/2014	8/18/2014	AP-16897	Jonah Energy	SIHI 7-15	MD-16897	12/16/2014	6.2	3.0	0.0	0.0	13.1	5.1	-6.9	-2.1	-6.9	-2.1	NA	Pinedale AQD Short Form
11/14/2014	8/20/2014	AP-16804	Jonah Energy	JF 1-8	MD-16804	12/16/2014	3.1	1.9	0.0	0.0	17.8	2.9	-14.7	-1.0	-14.7	-1.0	NA	Pinedale AQD Short Form
11/14/2014	8/22/2014	AP-16885	Jonah Energy	C-SIHI 10-30	MD-16885	12/16/2014	7.1	3.2	0.0	0.0	12.3	3.2	-5.2	0.0	-5.2	0.0	NA	Pinedale AQD Short Form
11/14/2014	8/22/2014	AP-16883	Jonah Energy	CAH 61-13	MD-16883	12/16/2014	12.8	4.0	0.0	0.0	13.1	4.0	-0.3	0.0	-0.3	0.0	NA	Pinedale AQD Short Form
11/14/2014	8/22/2014	AP-16882	Jonah Energy	JF 45-8H	MD-16882	12/16/2014	3.4	1.6	0.0	0.0	3.8	1.5	-0.4	0.1	-0.4	0.1	NA	Pinedale AQD Short Form
12/19/2014	8/29/2014	AP-A0000024	Jonah Energy	SIHI 1-32	P-0004210	1/21/2015	4.0	2.0	0.0	0.0	10.5	1.9	-6.5	0.1	-6.5	0.1	NA	Pinedale AQD Short Form
12/19/2014	8/29/2014	AP-A0000023	Jonah Energy	HAC 5-20	P-0004096	1/21/2015	1.9	2.1	0.0	0.0	6.9	0.8	-5.0	1.3	-5.0	1.4	NA	Pinedale AQD Short Form
12/19/2014	8/29/2014	AP-A0000025	Jonah Energy	CU 2-18	P-0004498	1/21/2015	1.4	1.1	0.0	0.0	7.2	0.6	-5.8	0.5	-5.8	0.6	NA	Pinedale AQD Short Form
12/19/2014	8/29/2014	AP-A0000027	Jonah Energy	CS 10-36	P-0004728	1/21/2015	1.8	1.8	0.0	0.0	7.2	0.6	-5.4	1.2	-5.4	1.3	NA	Pinedale AQD Short Form
12/19/2014	8/29/2014	AP-A0000026	Jonah Energy	SIHI 4-33	P-0004520	1/21/2015	5.4	2.7	0.0	0.0	4.6	3.0	0.8	-0.3	1.2	-0.3	NA	Pinedale AQD Short Form
	9/5/2014		Jonah Energy	SIHI 9-33			3.3	2.1	0.0	0.0	8.7	2.1	-5.4	0.0	-5.4	0.0	NA	Pinedale AQD Short Form
	9/5/2014		Jonah Energy	CF 15-24			1.7	1.2	0.0	0.0	10.5	0.6	-8.8	0.6	-8.8	0.7	NA	Pinedale AQD Short Form
	9/11/2014		Jonah Energy	CAH 14-25 Engine Mod			0.3	0.2	0.0	0.0	0.3	0.2	0.0	0.0	0.0	0.0	NA	Full Application - Engine Only
11/20/2014	9/11/2014	AP-A0000135	Jonah Energy	SIHI 15-27 microturbine removal	P-0000014	1/9/2015	-0.3	-0.2	0.0	0.0	--	--	-0.3	-0.2	-0.3	-0.2	NA	Full Application - Engine Only
1/2/2015	9/12/2014	AP-A0000053	Jonah Energy	CAH 14-25	P-0006018	2/3/2015	8.1	4.4	0.0	0.0	9.8	3.3	-1.7	1.1	-1.7	1.2	NA	Pinedale AQD Short Form
	9/12/2014		Jonah Energy	CF 16-2			1.9	1.4	0.0	0.0	8.9	0.5	-7.0	0.9	-7.0	1.0	NA	Pinedale AQD Short Form
1/2/2015	9/12/2014	AP-A0000052	Jonah Energy	CF 7-35	P-0005969	2/3/2015	1.8	1.1	0.0	0.0	6.3	0.5	-4.5	0.6	-4.5	0.7	NA	Pinedale AQD Short Form
1/2/2015	9/12/2014	AP-A0000083	Jonah Energy	COR 3-31	P-0006057	2/3/2015	10.1	2.6	0.0	0.0	37.7	3.6	-27.6	-1.0	-27.6	-1.0	NA	Pinedale AQD Short Form
	9/12/2014		Jonah Energy	CF 16-14			1.7	1.2	0.0	0.0	11.2	0.8	-9.5	0.4	-9.5	0.4	NA	Pinedale AQD Short Form
	9/19/2014		Jonah Energy	CS 12-36			2.3	1.7	0.0	0.0	8.5	0.5	-6.2	1.2	-6.2	1.3	NA	Pinedale AQD Short Form
	9/23/2014		Jonah Energy	SIHI 48-16			1.7	1.2	0.0	0.0	6.5	0.1	-4.8	0.4	-4.8	0.4	NA	Pinedale AQD Short Form
	9/23/2014		Jonah Energy	SIHI 48-22			2.7	1.7	0.0	0.0	27.5	4.2	-24.8	-2.5	-24.8	-2.5	NA	Pinedale AQD Short Form
	9/26/2014		Jonah Energy	JF 1-5X			6.9	3.2	28.6	4.8	--	--	-21.7	-1.6	-21.7	-1.6	NA	Pinedale AQD Short Form
	9/26/2014		Jonah Energy	SIHI 41-11			3.6	1.4	0.0	0.0	3.8	1.3	-0.2	0.1	-0.2	0.1	NA	Pinedale AQD Short Form
	9/26/2014		Jonah Energy	Tot Federal #1			3.3	1.2	0.0	0.0	6.3	0.8	-3.0	0.4	-3.0	0.4	NA	Pinedale AQD Short Form
	9/26/2014		Jonah Energy	SIHI 14-33			4.5	1.7	0.0	0.0	4.5	1.6	0.0	0.1	0.0	0.1	NA	Pinedale AQD Short Form
	9/29/2014		Jonah Energy	SIHI 11-20			13.2	3.6	0.0	0.0	28.5	5.1	-15.3	-1.5	-15.3	-1.5	NA	Pinedale AQD Short Form
	9/30/2014		Jonah Energy	SIHI 72-9			16.8	5.9	0.0	0.0	35.3	11.6	-18.5	-5.7	-18.5	-5.7	NA	Pinedale AQD Short Form
2/6/2015	11/3/2014	AP-A0000261	Jonah Energy	SIHI 12-36	P-0010206	3/10/2015	7.0	2.7	0.0	0.0	7.8	2.9	-0.8	-0.2	-0.8	-0.2	NA	IMPACT Forms
2/6/2015	11/3/2014	AP-A0000262	Jonah Energy	SAG 17-30	P-0009849	3/10/2015	2.3	1.5	0.0	0.0	4.9	2.1	-2.6	-0.6	-2.6	-0.6	NA	IMPACT Forms
2/6/2015	11/5/2014	AP-A0000263	Jonah Energy	SAG 73-20	P-0009874	3/10/2015	3.9	1.8	0.0	0.0	2.0	1.2	1.1	0.6	1.7	0.7	NA	IMPACT Forms
2/6/2015	11/7/2014	AP-A0000264	Jonah Energy	CAH 2-31	P-0010210	3/10/2015	3.9	1.7	0.0	0.0	6.1	2.1	-2.2	-0.4	-2.2	-0.4	NA	IMPACT Forms
1/23/2015	12/2/2014	AP-A0000142	Jonah Energy	Ten (10) Portable Rod Pump Engines	P-0002551	2/24/2015	10.0	7.0	0.0	0.0	--	--	10.0	7.0	15.0	7.7	NA	IMPACT Forms
4/3/2015	12/5/2014	AP-A0000426	Jonah Energy	JF 5-4			7.9	4.1	0.0	0.0	6.4	2.7	1.5	1.4	2.3	1.5	NA	IMPACT Forms
3/20/2015	12/5/2014	AP-A0000363	Jonah Energy	SIHI 3-34			6.7	3.3	0.0	0.0	7.2	2.6	-0.5	0.7	-0.5	0.8	NA	IMPACT Forms
4/3/2015	12/5/2014	AP-A0000429	Jonah Energy	SIHI 2-36			7.5	3.0	0.0	0.0	7.4	3.4	0.1	-0.4	0.1	-0.4	NA	IMPACT Forms
4/3/2015	12/5/2014	AP-A0000425	Jonah Energy	SIHI 10-33			5.6	2.5	0.0	0.0	16.4	4.8	-10.8	-2.3	-10.8	-2.3	NA	IMPACT Forms
4/3/2015	12/5/2014	AP-A0000427	Jonah Energy	SIHI 12-29			6.7	3.2	0.0	0.0	28.6	3.4	-21.9	-0.2	-21.9	-0.2	NA	IMPACT Forms
4/3/2015	12/5/2014	AP-A0000423	Jonah Energy	JF 3-5			3.0	1.4	0.0	0.0	9.1	1.2	-6.1	0.2	-6.1	0.2	NA	IMPACT Forms
4/24/2015	12/16/2014	AP-A0000379	Jonah Energy	HAC 14-30 Compressor Engine Replacement			8.1	5.8	0.5	8.1	0.0	0.0	7.6	-2.3	11.4	-2.3	NA	IMPACT Forms
3/27/2015	12/19/2014	AP-A0000415	Jonah Energy	JF 1-6			7.8	2.9	0.0	0.0	32.3	5.2	-24.5	-2.3	-24.5	-2.3	NA	IMPACT Forms
3/27/2015	12/19/2014	AP-A0000422	Jonah Energy	JF 1-4X			9.3	3.3	0.0	0.0	12.2	1.6	-2.9	1.7	-2.9	1.9	NA	IMPACT Forms
3/27/2015	12/22/2014	AP-A0000424	Jonah Energy	SIHI 13-22			7.7	3.5	0.0	0.0	17.1	3.2	-9.4	0.3	-9.4	0.3	NA	IMPACT Forms
3/27/2015	12/22/2014	AP-A0000421	Jonah Energy	SIHI 4-27			14.1	6.1	0.0	0.0	11.5	6.3	2.6	-0.2	3.9	-0.2	NA	IMPACT Forms
N/A	12/30/2014	Incorporated into previous WDEQ application	Jonah Energy	CAH 13-30			18.7	7.3	0.0	0.0	20.1	6.9	-1.4	0.4	-1.4	0.4	NA	IMPACT Forms
4/17/2015	1/16/2015	AP-A0000465	Jonah Energy	JF 2-8X			5.4	2.7	0.0	0.0	30.6	3.0	-25.2	-0.3	-25.2	-0.3	NA	IMPACT Forms
4/17/2015	1/16/2015	AP-A0000464	Jonah Energy	JF 2A-9			2.3	1.1	0.0	0.0	3.7	1.4	-1.4	-0.3	-1.4	-0.3	NA	IMPACT Forms
4/17/2015	1/16/2015	AP-A0000463	Jonah Energy	JF 13-7			2.5	1.4	0.0	0.0	3.2	1.2	-0.7	0.2	-0.7	0.2	NA	IMPACT Forms
4/17/2015	1/19/2015	AP-A0000458	Jonah Energy	SIHI 1-35			10.7	4.2	0.0	0.0	8.5	3.3	2.2	0.9	3.3	1.0	NA	IMPACT Forms
4/24/2015	1/21/2015	AP-A0000467	Jonah Energy	JF 5-6			4.5	2.4	0.0	0.0	5.6	2.0	-1.1	0.4	-1.1	0.4	NA	IMPACT Forms

4/24/2015	1/27/2015	AP-A0000491	Jonah Energy	JF 1-5			6.6	3.0	0.0	0.0	24.6	4.0	-18.0	-1.0	-18.0	-1.0	NA	IMPACT Forms
4/24/2015	1/30/2015	AP-A0000515	Jonah Energy	YP 1-13			5.0	2.4	0.0	0.0	18.2	2.2	-13.2	0.2	-13.2	0.2	NA	IMPACT Forms
5/1/2015	1/30/2015	AP-A0000533	Jonah Energy	YP 7-2			2.8	1.4	0.0	0.0	2.9	1.3	-0.1	0.1	-0.1	0.1	NA	IMPACT Forms
5/1/2015	1/30/2015	AP-A0000532	Jonah Energy	YP 10-13			4.6	2.3	0.0	0.0	27.8	3.5	-23.2	-1.2	-23.2	-1.2	NA	IMPACT Forms
	1/30/2015	AP-A0000535	Jonah Energy	YP 16-13			5.1	2.6	0.0	0.0	30.2	2.8	-25.1	-0.2	-25.1	-0.2	NA	IMPACT Forms
5/1/2015	1/30/2015	AP-A0000534	Jonah Energy	YP 10-14			4.6	2.5	0.0	0.0	23.4	3.3	-18.8	-0.8	-18.8	-0.8	NA	IMPACT Forms
	2/23/2015	AP-A0000604	Jonah Energy	JF 12-7			4.6	1.0	10.7	3.6	0.0	0.0	-14.1	-1.0	-14.1	-1.0	NA	IMPACT Forms
	2/23/2015	AP-A0000602	Jonah Energy	JF 8-7			5.5	2.5	0.0	0.0	7.4	2.5	-1.9	0.0	-1.9	0.0	NA	IMPACT Forms
	2/23/2015	AP-A0000603	Jonah Energy	SHB 1-34			6.0	3.2	0.0	0.0	6.6	3.4	0.2	-0.2	0.3	-0.2	NA	IMPACT Forms
	3/19/2015	AP-A0000728	Jonah Energy	SHB 8-14			14.4	6.0	0.0	0.0	9.2	3.6	5.2	2.4	7.8	2.6	NA	IMPACT Forms
	3/23/2015	AP-A0000765	Jonah Energy	JF 1-5X			8.0	4.2	50.6	4.1	--	--	-42.6	0.1	-42.6	0.1	NA	IMPACT Forms
	3/23/2015	AP-A0000763	Jonah Energy	SHB 6-35			9.9	4.3	0.0	0.0	10.9	4.1	-1.0	0.2	-1.0	0.2	NA	IMPACT Forms
	3/26/2015	AP-A0000778	Jonah Energy	SHB 10-35 Compressor Engine			4.1	6.1	0.0	0.0	0.0	0.0	4.1	6.1	6.2	6.7	NA	IMPACT Forms
	3/26/2015	AP-A0000777	Jonah Energy	YP 4-12 Compressor Engine			6.5	9.5	0.0	0.0	0.0	0.0	6.5	9.5	9.8	10.5	NA	IMPACT Forms
	4/7/2015	AP-A0000853	Jonah Energy	SHB 67-11			15.1	7.5	0.0	0.0	13.1	5.1	2.0	2.4	3.0	2.6	NA	IMPACT Forms
	4/10/2015	AP-A0000846	Jonah Energy	CAH 13-19			12.4	4.5	0.0	0.0	13.9	3.7	-1.5	0.8	-1.5	0.9	NA	IMPACT Forms
	4/15/2015	AP-A0000897	Jonah Energy	SHB 12-15			10.5	4.2	0.0	0.0	9.7	3.3	0.8	0.9	1.2	1.0	NA	IMPACT Forms
	4/29/2015		Jonah Energy	SHB 1-29 Compressor Engine			12.6	9.8	0.0	0.0	0.0	0.0	12.6	9.8	18.9	18.8	NA	IMPACT Forms
	4/29/2015		Jonah Energy	SHB 6-32 Compressor Engine			12.6	9.8	0.0	0.0	0.0	0.0	12.6	9.8	18.9	18.8	NA	IMPACT Forms
	4/29/2015		Jonah Energy	SHB 2-34 Compressor Engine			12.6	9.8	0.0	0.0	0.0	0.0	12.6	9.8	18.9	18.8	NA	IMPACT Forms
	4/29/2015		Jonah Energy	SHB 13-26 Compressor Engine			12.6	9.8	0.0	0.0	0.0	0.0	12.6	9.8	18.9	18.8	NA	IMPACT Forms
					JONAH ENERGY TOTAL		4651.9	1524.7	3939.8	759.0	3089.6	776.0	-2377.5	-9.8	-2816.5	-52.1		